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Including English language learners in Algebra One instruction

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INCLUDING ENGLISH LANGUAGE LEARNERS
IN ALGEBRA ONE INSTRUCTION

A Thesis Submitted
In Partial Fulfillment
Of the Requirements of the Designation
University Honors

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April 25, 2021
Date

Catherine M. Miller
Dr. Catherine Miller, Professor, Mathematics Education

Date

Dr. Jessica Moon, Director, University Honors Program

Introduction

Iowa is changing. During the 2000-2001 school year, 2.3% of K-12 students in Iowa's public schools were English language learners (ELLs). This percentage has increased as seen in the 2018-2019 school year, where 6.5% of public K-12 students were ELLs (State Board of Education, 2019). With this increase of ELLs in the classroom, there should also be an increase in knowledge for including these students in instruction. An inclusive classroom is an environment that allows all students the same opportunities to learn. In this case, classroom inclusiveness allows ELLs to have the same learning opportunities as their English-speaking peers.

Inclusion in the classroom can be difficult for teachers, but it is essential for all students to have equal access to education while feeling included and engaged in the classroom. I am a senior in the Mathematics Teaching program at the University of Northern Iowa whose graduates teach secondary mathematics. I have chosen to focus my research on this topic to inform my future in student teaching and in my own classroom, I have decided to focus my research on high school Algebra One courses. Algebra One is the first high school level math class students will take, so including ELLs in my instruction during this course is especially important.

I want to explore how to include ELLs in my teaching and in the community of students in my classroom, which will require accommodations to my instruction. In the Algebra One classroom, accommodations may include how to physically set up my classroom, how to utilize math discussions, or how to adapt assignments and assessments. ELLs need to feel a sense of belonging and inclusion with their peers to learn. Inclusion of all students is a very important part of teaching, especially when some students feel separated from the class and content due to language differences, accommodations must be made for them. The students' abilities to learn in

the classroom is very important, as well as their need to feel part of the community I create in my classroom. My research question for this thesis is: How can I create an inclusive classroom environment for English language learners in an Algebra One class?

Methodology

Recall that my research problem is to create a plan for an inclusive classroom for ELLs in an Algebra One classroom. I have expanded my literature review to inform this plan using scholarly journals and articles.

To analyze what I found in the literature I review, I created a Google spreadsheet to organize my findings. This spreadsheet has been organized into three categories that represent each of the variables in my research problem. These categories include teaching Algebra One, including ELLs in High School Math class, and secondary ELLs. Figure 1 below shows the teaching Algebra One page of my spreadsheet. In bold are two codes I identified as important to my plan that fit into this category, and relevant information from those articles are listed in the following rows.

Building a Discourse Community	Moving Students to the Why
"A substantial body of research identifies teachers' and stu	"Justification is a critical mathematical practice that must play
Suggests four methods for teachers to create more discuss	Justification -- explaining their reasoning for an idea or solution
1. Use a more open task	Claims that this is central to the learning of mathematics
2. Support think, pair, and revoice/compare	The article explains what the teacher needs to do to set a clas
3. Offer three ways to participate	Teachers need to clarify what it means to justify and then help
4. Define a contribution	**The problem here is also the huge role of <u>communication</u> in
ELL students need the same discussion to understand the	ELL students are trying to learn the language, but this requires
But they may struggle to follow along or to participate in th	An easy accommodation here would be for the teacher to exci
The conclusion offers two questions to ask while preparin	Though this may save both parties time, and may save the stu
*What challenges will your students face in participating in	If justification is so crucial to the learning and understanding o
*What supports are necessary to address these challenges	Idea 1 -- work with the student on math terms that are commo
These are good questions to ask because of the variety of	Idea 2 -- start by having students write down their justifications
However, I am not sure if they are in depth enough if a tea	*Need to dig into other accomodations that can be made for e
They will need supports for sure, but it might involve how p	Adjusting classroom practices like this will not always be an e

Figure 1: Spreadsheet for organizing data

I continued to develop codes to use to uncover themes and common ideas across my sources. These repeated codes have provided the data needed to address my research problem. Eventually, the information from each of my research variables helped me to set up a plan for an ELL inclusive Algebra One class.

As my research continued while creating this plan, I created an additional Google spreadsheet to organize my new data. This time, each tab was a different source where I included lists of useful information from that resource. I created a key of various categories and descriptions, shown in Figure 2 below, to color-code each point throughout my spreadsheet.

KEY	DESCRIPTION
Space/Visuals	How to physically set up the classroom space to assist ELLs and any visual aids that might be helpful for them
Class Discussions	Anything related to facilitating classroom discussion in a way that is accessible yet challenging to ELLs
Practicing English	Tips and recommendations on how to incorporate English practice for ELLs into math lessons and activities
Teacher Communication	How the teacher can communicate to their students who are ELLs during one-on-one discussions, lectures, etc.
Student Work	Accommodation suggestions on assignments and assessments to aid ELLs with understanding the material and focusing on the math
Student Interactions	Setting up a classroom environment that encourages inclusiveness, as well as allows for student interactions that benefit ELLs
Parents/Family	How to communicate with and include ELL guardians in what their student is learning and the progress they have made
Miscellaneous	Anything else that would be beneficial to know as a teacher of ELLs, including tips and tricks, things to avoid, common practices, etc.

Figure 2: Key used to code the data

Figure 3 demonstrates a tab of my spreadsheet that represents one source I utilized to find data. Each row of the spreadsheet includes an important piece of information from the source, and I colored each row according to the type of information it included, referring to the colors from the key. This method kept my data organized and proved useful while writing my plan.

Teaching mathematics and language to English learners -- Leith, Rose, King 2016 -- https://www.jstor.org/stable/10.5951/mathteacher.109.9.0670					
ELLs need to be learning English while learning their other content, such as mathematics.					
This article includes five questions to ask oneself while teaching ELLs >>> used in proposal					
Must incorporate meaningful English learning into the lessons, such as practicing with speaking and writing in English					
Works well to start ELLs working in partners, so they get comfortable and confident and can progress to sharing with a small group					
Use subtle strategies to incorporate writing into the math classroom, such as asking students to justify their answers in complete sentences, which is good practice for EL students					
Utilize classroom space to benefit learning... for ELLs the major aspect here is to use visuals and have them on display. Ex- word walls, images during lectures/lessons, students creating their own concept posters for the walls, etc.					
It is important to prioritize getting to know the students academically -- where they are both in English and mathematics.					
To make lessons and activities accessible, focus on the language used, so not to confuse students and force them to focus on the vocabulary rather than the math					
* These accommodations should be made without lowering the level of math for ELLs.					
* Cognates - words that are similar across languages... be aware of these, and avoid them to prevent terminology confusion					
Need to provide ELLs plenty of opportunities to practice their English in class					
* Many ways to do this, one example is writing in complete sentences to practice sentence structure and math vocabulary use					
* Always allowing students to talk... pairs, small groups, whole class					
* There are risks in learning math & a new language, so need to have a supportive classroom environment... norms					
Effective mathematics teachers support their ELLs' language development by using the classroom space to maximize student learning and facilitate student independence.					--> direct quote
* Word walls, anchor charts, other visual aids					
* Update visuals in the classroom for every section or unit, so that they are up to date with vocabulary words					
* Could have students create posters or other visuals, so they get good practice while writing/creating & also get to refer to the visuals when needed... good for all students, not just ELLs					
May be useful for collaborate with teachers in your school who are knowledgeable with teaching ELLs, whether this is an ESL teacher or another general education teacher with experience that would be beneficial to you					

Figure 3: Example of the sources with coded data

Each category from the key in my spreadsheet is a section of my findings. I analyzed the data for each category and wrote about them in detail in the findings section, which I used to decide on the aspects that would be most useful for teaching Algebra One. This information was pulled out and included in my plan for teaching ELLs in the Algebra One classroom.

Literature Review

In this review of literature, I will situate my research problem in the existing literature. In particular, I will focus on ELLs, setting up and teaching Algebra One, and inclusive teaching for ELLs in high school mathematics.

English Language Learners

The need for a better focus on including English language learners in the classroom is evident, and there is no better source than ELLs themselves. These students have personally

experienced education in the United States classroom while learning English, which is not their native language. Celedón-Pattichis and Ramirez (2012) captured the voices of ELLs in their work for promoting inclusive teaching practices. They have gathered observations and responses of high school ELLs in an English-speaking classroom that illustrate several teaching practices teachers use for ELLs that are ineffective. For example, a teacher may group ELLs together in order for the students to communicate with each other in their native language. The students pointed out they need to work with other classmates to practice their English and not feel excluded (Celedón-Pattichis & Ramirez, 2012). Another problematic practice is giving all students identical assignments to promote equality in the classroom, but ELLs often need accommodations (Celedón-Pattichis and Ramirez, 2012). Teachers need to practice promoting equity when appropriate, rather than just equality.

Another group of ELLs studied by Celedón-Pattichis and Ramirez (2012) created a list of recommendations for teachers of ELLs. Their advice for teachers included to be patient with ELLs, give them extra time to think and process, learn about their students' cultures, write things out, do not use cursive, and create a safe classroom environment for all students (Celedón-Pattichis & Ramirez, 2012). I find some of the requests on this list to show that teachers are not prepared to include these students in their classrooms or how to adjust their practices in a way that truly benefits the learning of all students.

Celedón-Pattichis and Ramirez also include stories from English-learning students looking back on their time in K-12 schools. These stories reveal examples of challenges ELLs face in school. Jae-won Jang, a student who participated in the research, entered an American school speaking English at the kindergarten-level, so he did not feel comfortable to speak in school for several weeks. Because of the difference in start and end times of the school year, Jae-

won Jang began the second semester of fifth grade after finishing fourth grade in South Korea. His homeroom teacher that year communicated with him using a translation book, but this was not useful for Jae-won Jang to work on his English skills. The only English he learned that year was from experiences outside of school. Math was the only subject he excelled in, but he was never challenged in math because it was all review for him. He had already learned the content in South Korea (Celedón-Pattichis & Ramirez, 2012).

Seung-eun Jang was placed in a fifth-grade classroom when he was ten years old (Celedón-Pattichis & Ramirez, 2012). He did not know any English at the time and was placed in fifth grade because of his age. Though he was able to work on his English in school and with a tutor outside of school, the fifth-grade math curriculum was too easy for him. Like Jae-won Jang, he was relearning things he had already spent time on in South Korea. Seung-eun Jang explained, "I wish that ESL (English as a second language) mathematics classrooms would assess and consider foreign students' knowledge of subjects other than English. The students from foreign countries come from different backgrounds, so their knowledge of subjects such as mathematics and science may be behind or ahead of the rest of the class" (Celedón-Pattichis & Ramirez, 2012, pp. 8-9). Evaluating ELLs in content areas other than English would allow them to be placed in classrooms appropriate for them.

Sylvia Celedón-Pattichis started attending a school in California at age eight. She was placed in a fourth-grade class, but she knew no English. Math was a strength of hers, but she struggled with word problems when there were no images to go along with them. Sylvia was labeled as an ESL student right away due to not speaking any English when she came to the United States. This label followed her until her ninth grade. Sylvia's ESL teacher gave her an opportunity to advance her English skills by allowing her to take a college-prep English class

when she began high school. Being placed in this course took away Sylvia's label as an ESL student and presented opportunities for her to take higher-level math classes. She eventually enrolled in college (Celedón-Pattichis & Ramirez, 2012). Sylvia's teacher advocated for her and changed the trajectory of her high school academic career.

These stories, and others, reiterate the importance of adapting instruction for ELLs. There were two concepts that seemed to be an underlying theme throughout the readings about the experiences of past ELLs in school. First, teachers need to advocate for their students (Celedón-Pattichis & Ramirez, 2012). Like Seung-eun, ELLs are placed in their courses primarily based on their English skills, so they are not always placed in the course or grade level that is appropriate given their prior math education. Teachers need to look for the accuracy of these placements because being put in a course too easy or too difficult does not help the students learn math. After assessing where an ELL should be placed, teachers need to support their student by recommending they be moved to a placement more suitable for them. In Sylvia's story, a teacher finally recognized that she needed to be challenged to expand her English skills. Sylvia was so grateful for that opportunity to learn and for her ninth-grade teacher challenging her. Being able to advocate for students begins with listening to the students and assessing their abilities and then gauging where they truly should be placed in school.

In addition to this, ELLs are just that - English language *learners*. This means teachers need to take time to listen to them while being patient. However, this also means the students need to be learning English while they are learning other content (Leith, Rose & King, 2016). As Jae-won Jang mentioned, he was only able to learn English during his first year outside of school because teachers were content with communicating with him via a translation book. No one worked with him on improving his skills or helped him learn to speak or write in English.

Educators of ELLs need to remember how crucial it is for them to work on their language building skills in all classrooms and not just outside of school. After all, school is supposed to be the place to learn.

Teaching Algebra One

Algebra One includes a variety of material, much of which revolves around solving equations. In Algebra One, students are introduced to variables, learn about linear and quadratic equations, and explore graphing equations. They are taught how to solve systems of equations and inequalities and cover numerous related topics (Khan Academy, 2020). There are common math classroom practices used to help students better learn the math content that may be inappropriate for students who are also learning English. Some of these teaching strategies include facilitating class discussions, giving high-level tasks, encouraging communication with precise math language, and asking students to articulate their thinking (Star, et al., 2015). Algebra can also be used to model real world situations, and including these types of situations in examples have proven to help students in their learning. I worry that not all these strategies are effective for students not completely familiar with the English language.

Classroom Discussions

Effective classroom discussions advance the math learning of all students (Leinwand, Brahier & Huinker, 2014). They are a time for students to share ideas, form connections, and gain clarity on new perspectives regarding their work. To ensure students talk as a math community, classroom discourse should be student centered; the teacher needs to act as a guide for students to be involved in a discussion that contributes to learning math (Leinwand, Brahier & Huinker, 2014). Students who are able to actively engage in such discourse will gain from the experience.

Hodge and Walther (2017) confirmed the importance of discussion in math class by stating, "A substantial body of research identifies teachers' and students' roles in small group and whole-class discussions and the intentional planning that is involved in guiding discussions that are consequential to students' learning" (pp. 432). However, with ELLs in the classroom, discourse will need to be carefully planned and managed in order to be productive for them. The conversations need to be made available to ELLs, so they are able to learn from them like their English speaking classmates.

Discussions, when not planned and facilitated carefully, are not always useful for ELLs (Murrey, 2008). Even if an ELL is making progress in their English acquisition, academic words may not be part of their vocabulary. Hodge and Walther (2017) encouraged teachers to prepare for discussions by asking themselves two questions: "What challenges will your students face in participating in this classroom discussion?" and "What supports are necessary to address these challenges?" (pp. 437). These questions are a great starting point for including ELLs who may struggle to participate in classroom discourse. However, depending on the level of English skills an ELL has, a teacher with ELLs in the classroom may need to prepare beyond these questions for the discussions in their class. The math still needs to be available for them.

Justification in Algebra One

Explaining one's answer or ideas in math class is called justification; it consists of answering the question of *why* an idea works. Justification is a critical practice in the math classroom for all levels (Cioe, King, Ostien, Pansa & Staples, 2015). Justifying one's own ideas allows a student to make connections between math concepts and helps others to understand their point of view. The main issue here for ELLs is again that communication is part of learning math (Murrey, 2008). Whether students are asked to write or speak their justifications, they are being

asked to communicate, in English, with someone about their newly forming ideas. Cioe, King, Ostien, and Pansa (2015) reinforce that justification is central to learning and understanding math. It allows students to make connections and explore the material deeper, which leads to understanding the content. For students who are not yet confident in their English skills, explaining their work in English may hinder their learning, especially while trying to incorporate math terms (Winsor, 2008). Justifying solutions and ideas for ELLs may need to be adjusted, so they are able to get the most out of this math teaching practice.

An easy accommodation for teachers to make for ELLs with both classroom discussions and justifications would be to excuse the ELLs. Teachers could avoid asking ELLs questions or give them a perfect score in the grade book to make up for their lack of participation. However, this would take away the students' opportunities to learn math and grant them no practice with English. I believe there are better ways to handle these situations and better accommodations to be made. That is what I hope to find in my research, so I can narrow down a detailed plan for myself, and others, in these situations.

It is common for people to assume math would be the easiest subject for English language learners due to the focus on numbers and graphs and, presumably not the language itself (Miller, 2020). Though math has a heavy focus on numbers and other symbols, learning the subject can be difficult for students when not taught in their native language (Brown, Cady & Taylor 2009). Challenges faced by ELLs are more than having a difficult time with word problems, either because they cannot read them or because of a cultural difference with some of the terms. They may also struggle with communicating their ideas or practicing useful vocabulary words (Winsor, 2008; Lager 2010). ELLs still need to be able to be active learners in

class. Therefore it is so important that teachers are aware of and become educated on the ways they can create a more inclusive classroom for ELLs. Otherwise, they may get left behind.

The Challenge of Cultural Contexts for Math Tasks

Some mathematical tasks are culturally challenging for ELLs to understand. This could be because of hidden assumptions that ELLs are unfamiliar with or misleading content or language that only native English speakers would understand (Lager 2010). Some words have two meanings, which could be confusing for a student who has just learned the word. For example, the word "bank" could mean two different things. If a word problem refers to a river bank, and an ELL recently learned that a "bank" is where people keep their money, it would be confusing for them to read about a bank on a river. This is the kind of cultural difference that may interfere with ELLs being included in math classes.

Open ended tasks often include real-world scenarios, which are essential for creating meaningful discussion in the classroom (Hodge & Walther, 2007). However, it is important that a teacher is aware of the culture differences that may challenge ELLs. Creating lessons that are inclusive for diverse cultures takes time to think through words, phrases, and contexts that could cause issues to arise for ELLs and their ability to learn.

To ensure cultural differences are not an issue, teachers might discuss the task they give to students, and the context in it, to be sure all students, including ELLs, understand the task (Wilburne, Marinak & Strickland, 2011). At times, talking about the context may not be enough; accommodations may need to be made for cultural aspects of a task that make the task not accessible for ELLs. Miller (2020) had a Hindu student in a math class she taught who was unable to do a problem given to her. Miller had a conversation with that student and found out that because of her Hindu religion, the problem that involved hamburgers was the issue.

Followers of Hinduism do not eat beef, and a task that revolved around beef was culturally inappropriate to her, making the problem inaccessible. Miller made an accommodation for the student by rewriting the problem for her student using "chicken sandwiches" instead of "hamburgers" and asked her group mates to use the term "sandwich" (Miller 2020). This was a simple accommodation that allowed the student to engage with the problem to learn math. .

Including ELLs in High School Math Class

I have pointed out various areas in teaching Algebra One that need adjustment for a class with ELLs. Making accommodations for various student needs is very important, especially for including ELLs in the classroom. Leith, Rose, and King (2016) constructed five practical questions for a teacher to ask themselves while preparing for instruction of a class with ELLs. I believe these questions address multiple aspects of teaching that need to be adjusted for ELLs, and they encourage the teacher to look for ways for the students to improve both their math and English skills.

The first question to consider is why ELLs are considered to be "English learners." According to Leith, Rose, and King, "...they have been identified as EL [English learner] students because they have not yet demonstrated a level of academic English proficiency comparable to that of their English-proficient peers" (Leith, Rose & King, 2016, p. 672). English proficiency of ELLs is required to be assessed annually. The data from these assessments are a great source for teachers to utilize to better understand the English skills their students have and where there may be areas of concern for a given classroom or lesson (Leith, Rose & King, 2016). Understanding an ELL's English proficiency skills are beneficial for educators to make all sorts of accommodations for that student.

Leith, Rose, and King (2016) then suggested determining what math the ELLs already know. This could also be done with an assessment, but the questions need to focus on mathematical content and not context, in order to strictly assess the students content knowledge. Figuring out where a student is in math will allow teachers to pinpoint areas that need improvement, as well as areas the student is ahead. Reviewing student work also provides the teacher with insight on how math is done in the student's culture because math processes are performed differently around the world.

The third question addresses how to make lessons accessible to ELLs while maintaining the cognitive demand of the tasks (Leith, Rose & King, 2016). It is very important to avoid simplifying the math content while adapting lessons and tasks for certain students. One example of making a task more accessible is to simplify the language of word problems. Instead of using complex situations that ELLs may struggle with, one could adapt the problem to be about more common items that include vocabulary words the student would understand (Lager 2010). The important thing to remember is that the students need the opportunity to advance their English skills, but they also need to be able to understand the math.

An example of this adaptation to a word problem comes from Erika Schultz, an algebra teacher at Waterloo West High School who has much experience with ELLs. According to Miller, (2020), Erika eliminates wordiness in student work whenever possible, to simplify the problems for her ELLs. This typically means taking the context out of word problems, so the students are able to focus on the math and what is being asked of them. For example, Erika's non-ELLs were asked to use a stem-and-leaf plot to find the median and mode of the number of visitors at a given park on the Fourth of July. To simplify this problem for her ELLs, Erika simply asked them to find the median and mode of the given stem-and-leaf plot without any real-

world context (Miller, 2020). Taking away the information about the visitors, the park, and the Fourth of July simplified the problem for her ELLs and allowed her to assess whether her ELLs understood median, mode, and a stem-and-leaf plot.

Next, Leith, Rose, and King (2016) confronted the challenge of incorporating meaningful English learning into lessons. In order to practice, ELLs need opportunities to speak and write in English. As I mentioned about class discussions earlier, this needs to be carefully planned and facilitated to be effective. Sharing with partners, that is working in groups of two to build up to ELLs being comfortable in small group discussions is a way to start (Leith, Rose & King, 2016; Murrey, 2008). Soon, ELLs can fully participate in whole-class discussions. This allows the ELL to become more comfortable sharing in English as they practice their language skills and gain confidence before speaking to the entire class. Large writing opportunities are not typical in Algebra One, but there are subtle ways to include writing practice in math tasks. One suggestion is to ask all students to justify their answers using complete sentences on their assignments. This practice does not single out the ELLs, and it allows them to apply written English communication into their math work. Moreover, native speakers will improve their abilities to communicate and learn math with this practice (Leith, Rose & King, 2016). This practice is simple to incorporate into classrooms and is beneficial for ELLs and native English-speaking students alike.

Lastly, the question of how to utilize classroom space for student learning is important to consider including ELLs in lessons. Leith, Rose, and King (2016) recommended using visuals that support understanding the English. Word walls, for example, are clusters of vocabulary words written on cards that are on display for students to refer to if needed. These could be used to group similar math terms together that could be useful for ELLs in conversations. Images

should be available for them to refer to during a lecture or word problem that illustrate the context of the problems. Having students create their own posters on the current topic could be a worthwhile and creative task (Leith, Rose & King, 2016). I believe these are great practices for thinking through a lesson to include ELLs. Each of the five questions address an aspect of teaching in the math classroom that is needed to accommodate these students. As my research continues, I plan to find more recommendations like these that will be useful for creating an inclusive Algebra One classroom for ELLs.

Findings

In my findings, I will present the important ideas I discovered in the literature I read. The ideas from my research will be applied in my plan for an inclusive classroom.

Space and Visuals

Space and visuals include utilizing the physical classroom space to promote learning. "Effective mathematics teachers support their ELLs' language development by using the classroom space to maximize student learning and facilitate student independence" (Leith, Rose & King, 2016). Creating meaningful lessons and accommodating assignments are not the only things that can be of use for ELLs in class. Teachers can also utilize the physical space of their classroom to enhance learning for ELLs. Such space can include the set-up of the room or visuals that are displayed in various ways and places.

One way visuals can be displayed is during a lesson, either by images on a slide show presentation or physical objects the teacher brings in. If a real-world example has some vocabulary or content that may confuse new English speakers, the addition of a picture to represent the scenario would be very helpful for ELLs to follow along. Physical objects may be useful in other cases, such as when discussing volume. If a class is asked to compare the volume

of an ice cream cone and a softball, and an ELL is not familiar with these English words, having an ice cream cone and softball to look at may allow them to comprehend the question better.

In addition to this, teachers can utilize their classroom walls to help their ELLs. Leith, Rose, and King (2016) suggested the use of word walls, anchor charts, posters, and any other visuals that would be beneficial. Word walls and anchor charts are great tools for defining and connecting vocabulary words. If students are unfamiliar with the term "subtract" in English, for example, it would be useful to have a grouping of words on the wall consisting of "subtraction," "minus," "take away," and other similar words or phrases (Leith, Rose & King, 2016). Then ELLs can look at the word wall or anchor chart when the word subtract is used in class, and they can remember that this means to take one value away from another. Posters can also be used for similar things, as well as images of graphs, tables, or other useful objects.

These visuals should be updated for each section or unit, in order for students to have current material and vocabulary available to them. Another idea to make visuals interactive is for students to create their own posters, or other projects, to enhance their learning while providing them with important content reminders (Leith, Rose & King, 2016). Students will obtain good writing practice through this creating, and if they are group projects, they will also be conversing with their classmates. The final product will result in materials to be displayed in the classroom and referred to for help remembering what certain words or concepts are. This would be beneficial for all students, not just ELLs.

Class Discussions

As previously mentioned, discussing math is a key aspect in understanding it well and drawing connections between concepts (Hodge & Walther, 2017). Therefore, it is very important that all students, including ELLs, can participate in discussions in order to enhance

their learning experience. Murrey (2008) emphasized the importance of preparing discussions that are well thought out in order to be beneficial for ELLs. In most cases, it is useful for ELLs to begin sharing in pairs to build their confidence and comfort levels of talking about math in English. After practice with this, students can progress to small group discussions and eventually discourse among the whole class (Leith, Rose & King, 2016; Murrey, 2008). This discussion scaffolding model will ease ELLs into speaking up in class and will provide them a safe environment while doing so.

Winsor (2008) learned three main strategies about ELLs involved in group work that contribute to how conversations in groups unfold. First of all, ELLs should not be all paired together in a class with multiple ELLs. This will improve the communication that takes place among the group members and will allow a wider range of English math words to be introduced in conversation, so all students can learn throughout the group tasks. Second, groups should be altered semi-frequently, so group members do not become complacent and slack in their communication. This type of mentality towards group work would not be useful in advancing English discussion skills for ELLs. Lastly, educators need to be sure ELLs know how to work and contribute in a group. Not all cultures have a norm of students working together in groups, so they are not used to working with their classmates and do not know how to do so effectively. Teachers should figure out how to best inform their students that each group member needs to contribute to their group and share their ideas with each other. According to Winsor (2008), incorporating these points about group work are effective for ELLs. He found that good conversations in groups results in students becoming more confident using math vocabulary in English. Students who continued practicing their English skills in math groups

also were able to explain concepts to other students, which allowed them to gain a deeper understanding of the math.

Practicing English

ELLs are learning two things in the math classroom: math and English. This being said, it is important for general education teachers to incorporate meaningful language practice into their lessons and classroom. Since ELLs are working on their English skills even in the mathematics classroom, math teachers are also language acquisition teachers (Murrey, 2008). This comes with a responsibility to incorporate English practice in writing, reading, listening, and speaking.

There are ways to be subtle about including English practice into lessons that do not single ELLs out. According to Leith, Rose, and King (2016), one effective practice is to ask all students to justify their answers on assignments and tests using complete sentences. This provides opportunities for ELLs to work on sentence structure and use of math vocabulary, and it allows them to practice writing in English in general.

Another method of incorporating English practice is to allow students to talk as much as possible (Leith, Rose & King, 2016). Any time conversing with other students is an option for part of a lesson, they should be given that opportunity in order to gain experience listening and speaking in English. Such discourse can be in the form of partner, small group, or whole class discussions, though beginning with partner sharing and progressing to class discussions may be a good scaffold for ELLs, depending on their comfort level. Regardless of how conversations are happening, the students need to feel safe to share (Leith, Rose & King, 2016), which comes with having a supportive classroom environment that promotes participation.

One idea to create this safe environment for ELLs is to provide them with sentence frames to use while conversing with classmates. This means the students are given the trivial words of a sentence, and they are to fill in the rest. These sentence frames provide ELLs the language necessary to have discussions with their classmates. (Bresser, Melanese & Sphar, 2009). According to Bresser, Melanese, and Sphar (2009), the type of frame given to the ELL should depend on how it is being applied. " If students are sequencing the steps that they would use to solve a subtraction problem, they might use this sentence frame: First I _____, then I _____. If students are comparing and contrasting quadrilaterals, they might use this frame: A _____ has _____, but a _____ has _____. _____ and _____ both have _____." (Bresser, Melanese & Sphar, 2009, p.173). These types of sentence frames provide ELLs with the structures of sentences that are useful in creating a sentence while trying to express their ideas to others.

Making accommodations for ELLs is very important for an equitable teaching practice. However, these accommodations should still allow the students to exercise their English skills and make progress in this area. While math is important, so is their ability to communicate in English as they transition into an English-speaking culture and environment. Recall the story of Jae-won Jang, whose fifth-grade teacher communicated with him using a translation book (Celedón-Pattichis & Ramirez, 2012). Though this was an accommodation that was helpful in teacher/student communication, Jae-son Jang claimed to have not learned any concrete English from school that year, which did not do him favors moving forward in an English-speaking school. Stories like this emphasize the importance of teaching both math and English to ELLs.

Student Work

Students need to understand what they are taking in, whether that be reading or listening (Murrey, 2008). It is especially important for ELLs to be able to comprehend what they are taking in while working on homework assignments or tests. Student work needs to be adjusted to fit the needs of ELLs, rather than assuming they will ask questions when they do not understand something. This approach complicates things for both the student and the teacher.

Math tasks can be culturally challenging for ELLs to understand due to hidden assumptions or misleading language that native English speakers do not realize (Lager, 2010). Cognates, for example, are words that are related or similar in different languages because of their root word. Cognates may be difficult to understand for ELLs if the word has multiple meanings in English and the student considers the word out of its intended context. It is important for teachers to be aware of cognates on the work they give students and avoid using them to prevent terminology confusion (Leith, Rose & King, 2016). Teachers should also be aware of the other ways their assignments include hidden meanings to students from various cultures.

Sometimes the issue is not so much the exact words that are used, but rather the amount of language that is used. Real-world problems are great for truly understanding math concepts, but problems that are too wordy can distract ELLs from the math itself, as they have to spend so much time thinking about the meaning of the problem. Teachers should avoid wordiness, so their students can focus on the math content during their homework and assessments. Regardless of the type of accommodations being made for student work, it is important to keep in mind that ELLs should be accommodated for their language needs. As Willner, Rivera, and Acosta (2009) put it, ELL accommodations and special needs accommodations are not the same. Though

sometimes what works for individual students are similar, ELLs should only be accommodated for their language-related needs, and the level of math should not be lowered for them.

There are several ways to improve student work to be better fitting for ELLs in the class. In addition to avoiding cognates and wordy problems, tasks should use common language vocabulary whenever possible (Lager, 2010). This ensures that the language being used is not too challenging for ELLs to understand, so they can focus on the mathematics, because of the simple language being used. For testing accommodations specifically, there are several routes that could be taken to create a test fitting to test the math knowledge for an individual student. Some students may need more time for their tests, so they are allowed more time to read and understand each problem. Others may need a dictionary or another tool in case there are words they do not understand. Regardless of the accommodations, students should be given the opportunity to practice using their testing accommodations prior to using them on a test, so they are aware of how to use their accommodations properly and effectively (Willner, Rivera & Acosta, 2009). Depending on the type of accommodations, it may take time to get accustomed to using them.

Murrey (2008) also suggested that students are given tasks with multiple entry points in order to create a safe English learning environment. With this, there is not one correct way to get the solution to the problem, so students may feel more comfortable sharing their ideas and trying new things. Another tactic for creating a safe space for ELLs is to encourage cooperative learning where students are constantly working together on their assignments. In a smaller group setting, ELLs may not feel as intimidated to ask questions or make comments to their peers, rather than while a whole class discussion is taking place (Murrey, 2008). Both of these ideas revolve around creating a space where ELLs are comfortable to communicate with peers.

A very important aspect in making accommodations for students is to keep in mind that making adjustments should not be a one-size-fits-all approach. Every student has individual linguistic needs (Willner, Rivera & Acosta, 2009), and their differences are important to determining the accommodations that would be best fitting. Educators should focus on each student, their background, and their individual needs to best accommodate work for them. They can gain knowledge about a student and their background by having a conversation with the student, as well as other teachers who have had experience with them. Teachers could also gauge the student's level of English skills and research appropriate teaching strategies and accommodations based on their current skills set.

Student Interactions

Pulling ELLs out of mainstream classrooms for individual work time does not do them any favors in making new friends or feeling included with their peers (Kilman 2009). Sometimes, rather than being pulled out to work one-on-one with a para, ELLs are taken out of class to go into a separate classroom and work amongst other ELLs. This practice is one of several things that may give the impression that ELLs are outsiders when it is important for them to interact with their English-speaking classmates and feel a sense of belonging with them. Kilman gives praise to social inclusion programs, which allow ELLs to learn alongside their English-speaking classmates. These programs encourage participants to value each student's abilities and to view everyone's skills as valuable in some way.

Much of how students interact with each other will reflect the norms and rules of the classroom. It will be important for teachers to set an early precedent for how to view and value the ideas of all other learners. Students should learn early on how to work together and be

helpful to each other, which will create the environment necessary for ELLs to feel welcomed by their peers and have positive interactions with them.

Parents and Family

Because there are often diverse dynamics between home and school for ELLs, the relationship between the two is very important. "Connections between ELL families and their children's schools help to build bridges between the two worlds in which the ELL lives" (Colombo, 2012, p. 239). It is important to have good partnerships and connections between the school and the home of ELLs in order to seem available for them. This can only be accomplished through creating a welcoming and inclusive environment for the student and their family. Colombo (2012) suggested three strategies for learning how to create this environment and communicate with parents or guardians of ELLs.

First, a teacher needs to recognize any biases they have toward people of different cultures, even if these are implicit biases, and reflect on any fears they have in communicating with them. Next, Colombo recommends walking through the halls and reflecting upon their school and classroom, being critical about whether it is a welcoming environment to ELLs. Lastly, the teacher should contact the parents. They can call the parents themselves, if they speak some English, or with the help of an interpreter. During this conversation, the family should be invited to the school to show them where their child will be spending their time.

Another strategy for displaying inclusiveness is asking the family to teach a greeting in their language, so communicating with them can begin to feel more comfortable, and they feel as though their language is valued in the classroom. This can take place during the first meeting with the family, when they are given a tour of the school. In addition to this, the teacher and guardians should decide on the best way to communicate, so they know for the future. Some

families may recommend an email, while others prefer a phone call or meeting. Regardless of how communication is handled, the teacher should reach out to the parents as soon as possible. Initial communication with parents should not be when there is an issue with the student that needs to be discussed (Colombo, 2012). To build trust in the partnership with an ELL's parents and make them feel valued regardless of the differences, the teacher should initiate contact early.

Teacher Communication

It is clear that an educator's goal while teaching ELLs should be to assess content knowledge rather than one's English abilities, and there are ways to ensure this principle while communicating with students. This communication could be in front of the whole class, in a one-on-one setting, or in any other way a teacher might communicate with a student, either verbally or nonverbally. First, it is important for a teacher to be aware of the language they use in class, or anytime speaking to an ELL, so their students are able to process everything their teacher says to them (Hill, 2016; Leith, Rose & King, 2016). Practicing using language that ELLs can understand will serve them well in their ability to listen and communicate with their teacher. According to Wilburne, Marinak, and Strickland (2011), a second practice that teachers of ELLs can incorporate into their teaching is to discuss tasks with the class before asking them to start their work. Both the expectations and context of the task should be discussed, and doing so will provide an opportunity for ELLs to understand what is being asked of them.

Leith, Rose, and King (2016) stated the importance of getting to know one's student academically, meaning a teacher must learn their ELLs' math and English proficiencies in order to understand where each student is in these areas. One option for this is to collaborate with other teachers who know the student and/or have experience with them (Leith, Rose & King, 2016; Willner, Rivera and Acosta 2009). Anyone with connections to the student could be

useful to have as a resource, such as the student's past teachers, the school's bilingual teacher, or anyone else in the school with knowledge about their needs. Having this team of cooperating teachers is beneficial in many other ways as well. For example, as suggested by Willner, Rivera, and Acosta (2009), a team for each ELL would ensure multiple perspectives are being considered when discussing a student's needs and determining the accommodations appropriate for them. This is a great way to be sure the best accommodations are being made for each student because there are various people with different perspectives on the student who are helping to make adjustments just for them. A team of teachers will also help determine the best ways to interact and communicate with the student individually because of educators who have had previous experience with that student and know what does and does not work for them.

A very important aspect to consider in all of this is the student's language proficiency. One must understand and consider an ELL's language proficiency in order to support them in their learning of English (Murrey, 2008; Hill, 2016). Where students currently are in their English-speaking abilities will help determine how a teacher communicates with them and the type of accommodations they will need. Learning a student's language proficiency can come from an individual conversation with the student, talking to their past teachers, or evaluating the student early on in the school year.

In addition to understanding language proficiency, it is important to remember that each ELL is a unique individual. Hill (2016) said a teacher should not expect the same from each student because they are all different and learn differently. Some will learn math and/or English at a quicker rate than others, and others will need extra attention. It is necessary for an educator to not generalize accommodations for all ELLs, but rather to make adjustments for each individual student's specific needs.

Though all students are different, there are some common practices for teachers to utilize that are useful for most ELLs. Murrey (2008) suggested several practices, such as speaking slowly, repeating important information, pausing to check for student understanding, and using plenty of gestures, objects, and other visuals. Teachers could also ask students to rephrase tasks in their own words prior to completing them, to make sure ELLs understand the task. All of these strategies can be used during a lesson while teaching the entire class. Something to be aware of both in front of the class and while working one-on-one with an ELL is to avoid slang, so there is no confusion in the meaning of the words being used.

One final idea from Murry (2008) that would benefit ELLs is to introduce new vocabulary terms after students have learned the content. This means students should learn the content through tasks and exploration prior to being given the vocabulary involved, so the new words or phrases do not confuse them while learning the concept as a whole. For example, if students in algebra one are doing a lesson about converting an equation in slope-intercept form, $y=mx+b$, to point-slope form, $(y-y_1)=m(x-x_1)$, the teacher should show the students how to do this conversion before introducing the term "point-slope form." Then, the student can focus on learning how to use this equation, rather than the vocabulary. Once students seem to understand this new concept, the name of the equation can be introduced.

Teaching Plan

I have created a plan for my student teaching and future career in teaching based on my research. When I begin my teaching career, I will have an idea of how to set up my classroom to be inclusive for all learners, starting from day one. This plan will include how to physically set up my classroom, how to communicate with my students effectively, how to include parents and guardians in the learning, and other aspects included in my findings.

The first thing I will do to begin each school year with inclusiveness is set up tables into groups. I may not have control over this in my student teaching experience, but once I have my own classroom, I will do this for several reasons. First of all, small groups will encourage teamwork and discussions among students. This goes for all students, including ELLs. Instead of isolating students to their own desks, which can often be an issue (Kilman, 2009), students will be surrounded by others to create discourse, ask each other questions, and work together as they are learning.

In addition to encouraging discussion, setting the tables up in small groups will be advantageous to ELLs as they are practicing their skills of speaking English. Based on Murrey's conclusions (2008), ELLs need opportunities to speak English, but they should not be put into situations of talking in front of large groups right away. Instead, they should build up to this while gaining confidence by first discussing in pairs or small groups. Groups of desks will allow such discussion to take place and will help ELLs to feel more comfortable speaking to their classmates while still learning English.

Lastly, grouping students desks will ensure that students are not left out during group work. When desks are spaced out and a teacher allows students to work on assignments or activities with others, it is up to the students to form groups and work together. With this very open strategy of forming groups, it is likely some students will be left out due to not being asked to be in a group, whether that is intentional or unintentional by other students. Kilma (2009) argued that ELLs are labeled as shy when they just feel left out due to lack of social interaction in their classmates.

In addition to the desks, I will physically prepare my classroom by using the space on the walls. For example, a word wall, which I mentioned before, would be useful for ELLs while

conversing with their peers because they can look to it for commonly used math terms and their definitions (Leith, Rose & King, 2016). In addition to words and definitions on the walls, I will include pictures where appropriate, such as for graphs or tables, so students can also visualize the words if needed.

Another idea is to print off my notes every few days and have a place to keep them, either on the wall or a counter, where students can access them. Then, if students missed something from a previous lesson because of a language or understanding issue, they can refer to the notes and ask any questions they may have. For students who do not feel comfortable asking questions directly, this may be useful for when they miss pieces of information from a class and still makes that material accessible to them.

The next thing I will do to ensure inclusiveness is get to know my students. Similar to setting up the classroom to include ELLs, this also takes place before the school year begins. Of course, I will get to know them more when I meet them, but I will learn about my students and their needs before the school year begins in order to know where each student is at individually. After receiving my rosters for the semester, I will look into any information I am given for some students, such as IEPs or 504 plans. This will allow me to understand the needs of all students who require extra support, but it will also help me to specifically assist my ELLs.

From reading about accommodations that need to be made for my students, I will know where they should sit in the classroom, who they should sit by that would be beneficial to them, and how often I need to check in on them for understanding. In addition to these things that take place inside my classroom, I can reach out to others who will be helpful in the success of that student. As Leith, Rose, and King (2016) suggested, it would be beneficial to reach out to the parents, the ELL teacher, or anyone else the student may meet with regarding math and English

learning. This will allow me to be prepared for the school year with that specific student and anyone in their life I may need to be in touch with.

Once the school year starts and I meet my students and inform them of the semester ahead, I will begin to set up an inclusive classroom, which is a classroom that appreciates all learners and abilities. This is much easier said than done because it takes work from both the teacher and the students in order to make all learners feel welcomed and valued. Creating inclusiveness will only happen if we have classroom norms that reflect the type of classroom we would like to have. Classroom norms are rules that are agreed upon by both the teacher and the students. These norms will include things such as turning in your homework on time and asking permission before leaving the room. However, I will make sure to include norms that encourage students to be inclusive of all their classmates, and then I will lead by example. These types of norms include, but are not limited to, being kind and respectful to your peers, making sure everyone is included in a group during work time, and having patience while working with your peers.

My introduction to the classroom norms will take place right away on the first day of school, so that students know what they can expect and what is expected of them in my class. In addition to this, I will have seating charts already arranged for my students on the first day of school. This will ensure that ELLs are not placed in a partnership or group that is separated from other students, so they can interact with students with English as their first language. This seating arrangement will be adapted as I get to know my students better and learn who should and should not sit next to each other, but it will be a good start for inclusiveness.

Within the first week of the semester, I will contact the parents and guardians of my students. According to Colombo (2012), the initial contact with ELL guardians should be

positive and intentional, so they feel as though they and their students are welcome. I plan on doing this for every semester I teach in order to reach out and introduce myself to guardians I have not met and to let them know how class will work and that I am always available. I especially think this communication will be important for ELL guardians. There will be a range of ability to speak English that varies between individuals, so I think it will be important to figure out the best way to communicate with them at the beginning of the year. Then, when communication needs to take place, we will know how to do so effectively, and they will feel comfortable with how it is handled.

The next aspect of my class that I need to plan for is how I make accommodations during my lessons. When I am in front of the whole class teaching, there are several things I can do to help the ELLs in my classroom. First of all, I can use visuals such as images or props. If I am introducing a key vocabulary word, such as parabola, which is the graph of a quadratic equation, I will want to show an image of this graph either by a projected image or by drawing it on the whiteboard. If I am working through an example problem that involves nonmathematical content, such as using a sliced pizza to demonstrate fractions, I will display an image of a pizza cut into sections that I can refer to while I speak. This will give ELLs a better understanding of the conversation, so they can see exactly what I am talking about.

Another form of visuals is facial expression and body language. These will be very important while I am teaching, so that students can watch my nonverbal communication. Referring to the pizza and fractions example, if I write $\frac{2}{8}$ on the board and point to one slice of pizza, I want to convey to my students that this is incorrect, that I am pointing to one eighth of the pizza and not two eighths. Instead of just saying that this is not correct, I could shake my head while pointing to both the number and the slice. Then, I can point

to two slices of pizza and nod my head to let students know that I am pointing to the correct fraction. This is just one example of body language in the classroom, but there are so many ways to incorporate this into lessons for ELLs, such as hand gestures and more.

In addition to visuals while I am teaching the entire class, I think a vital part of my teaching format will be partner check-ins. By this, I mean asking students to repeat what I just said to their partner or table group and to make sure everyone in the group understands. Murrey (2008) suggested incorporating check-ins into lessons, and I believe doing so with a partner allows for repeated English practice. These check-ins could go several ways. If all the students are able to repeat what I said while having an understanding of it, then I will be able to move on in my lesson. However, maybe one or two students are not quite sure what is meant. This is a great opportunity for their partner to help them best they can, which is good learning for the teacher and the listener. Lastly, if both partners are confused or one cannot explain the concept to the other, I will be there to answer questions. I can either talk to students separately or, if something is unclear to several students, I can address the whole class.

I believe these partner check-ins will be especially beneficial to my ELLs because it will give them an opportunity to pause from listening and make sure they are comprehending what is being said. They will also create built-in time for English practice while having mathematical conversations with their classmates. I will make these check-ins as frequent as needed, making sure to incorporate them after any vital piece of information that I do not want students to miss.

In addition to teaching the class as a whole, I need to have a plan for working with ELLs one-on-one. The ELLs that will be in my classroom will vary in their English-speaking abilities greatly. It will be important to understand this while speaking to my students because some will be further along than others, and some will require more time and patience for good

communication. I think the best thing for me to do to improve my ability to communicate with ELLs who have much improvement to do on their English is to pull them aside right away during the year. During this time, I can try to have a conversation with them to gauge where they are in their English skills and brainstorm ways to better communicate if needed. This could include reaching out to coworkers who also have the student in class and getting ideas from them. It may also require me to do research on how to communicate with a student at this level of English. I think it will depend on the student and the situation when it arises. The most important thing to keep in mind, though, is to not take the easy way out. Jae-Wong Jang, a student I have mentioned before, communicated with his homeroom teacher using a translation book (Celedón-Pattichis & Ramirez, 2012). This student was not able to learn any English through this form of communication with his teacher, which made him feel behind. Therefore, I will need to work with my students, make adjustments, and find the personalized communication strategies that work best for each of them. As Willner, Rivera, and Acosta (2009) said, accommodations are not supposed to be one-size-fits-all, as each student is a unique individual.

Group work is very important in the math classroom, so students are able to learn from each other and have math-related conversations. As I encourage group work in my classes, I will need to make sure ELLs feel included and are able to benefit from their groups. Classroom norms, that are set at the beginning of the year, will be important in this area. As I mentioned previously, it will need to be a norm of my classroom for students to look around during group work time and make sure everyone is included in a group, so no one is left out to work on their own. Another useful norm will need to revolve around what group work should look like. All group members need to be able to participate in order for the group to be effective. I can reinforce this rule by circulating the room during work time and listening to who is doing the

talking in each group. If not everyone is participating, either because some people are taking over or others are not sharing their ideas, I can step in and respectfully address the situation.

The items I ask students to do in my class also need to be accommodated for ELLs. In-class work, homework assignments, and assessments will all need to be carefully considered in order to assess the students math skills and not their ability to understand the nonmathematical content. Any math teacher will know the importance of relating the class material to the real world in order to justify that what the students are doing is important and applicable to their lives. However, sometimes the real world is not the same for all students, meaning a student with a different background or culture may not understand some things as well as the rest of the class. For example, if a problem relates to the Fourth of July celebrations, in order to relate to the lives of students, some students may not understand why this date is such a big deal, which could distract them from the math involved in the problem. Another way the content or wording of a problem or activity could confuse ELLs is through words with double meaning. For example, if I am giving the students an applied problem with measurements in feet, ELLs may not be able to understand the problem because they know the word "feet" as the body part. Another example could be the word bank. If I give them a problem concerning the width of a river bank, some students may get confused about what I am asking, as they are picturing a bank building. This is where careful thought comes into play, as well as images on a worksheet that would be useful for student understanding.

Besides making accommodations for the wording on assessments, other testing accommodations may need to be made for ELLs. This is yet another reason it is necessary to know each individual student and their needs for learning. Since assessments are often major parts of the grade, it is important to truly make sure that math comprehension is what is being

assessed. Students need to be taken out of the classroom for tests in order to have someone reading the test to them or answering content questions. For this type of accommodation, I can line another faculty member up to pull the student out of the room and assist them while taking the test, or I can make other arrangements for the student to come into my room outside of class, so I can be that person for the student. There may be other accommodations as well, and that will require working well with the student and being flexible in order to put their needs first.

I believe one of the most important aspects of teaching ELLs, aside from making sure they understand the math material, is granting them plenty of opportunities to practice their English. If they are not able to improve, communicating in school and in life will not get any easier (Leith, Rose & King, 2016). There are a couple realistic practices to incorporate into my classroom in order to allow my ELLs this practice. I will ask students to use complete sentences whenever they are asked to explain their work on paper. I will not be harsh about grading this on student work, but I will make it a classroom norm and reinforce this norm when needed. With this small practice, ELLs are given the opportunity to practice writing English in complete sentences, but they do not feel singled out or as if they have been asked to do extra work compared to their classmates because everyone will be asked to do this.

I will also make as much time as possible for discourse to take place in my classes. This allows ELLs to practice their English verbally and also provides time to feel included with their peers. According to Murrey (2008), this should be a discourse progression. Students will begin discussing in pairs, so the ELLs become comfortable sharing with their classmates verbally. This will progress to small group sharing, in order to get ELLs more comfortable talking to groups of students at a time. Eventually, we will get to the point where ELLs will feel

confident enough to share in front of the entire class, so they can become comfortable talking to larger groups of peers in a safe environment.

As ELLs get all this oral communication practice, they should begin to feel more comfortable speaking in class discussions. Before, while talking about ELLs sharing in front of the class, I was referring to them presenting their work after I ask them specifically to do so. Class discussions are different in the fact that they create an opening for anyone to raise their hand and share anytime they feel as though they have something to say. Some ELLs may not have hesitations with this, while others may feel more reserved to volunteer to talk.

For those who may feel uncomfortable with class discussions, there are still ways to ensure they can learn from these discussions. One idea is to check in with all students during discussions in order to get those listening involved. After a student or I talks about a key point that is important for everyone to understand, I may ask students to give me a hidden thumbs up or thumbs down, so I know if we need to review that information. Another method is to repeat the important things other students say, in order to stress the importance of what was said or to give ELLs another opportunity to listen to it. Listening to a discussion is just as important as partaking in it, so I will need to make sure ELLs are able to understand what is being said, even if they do not feel ready to participate.

However, if I have conversations with this particular ELL, and I feel as though it would be a good challenge for them to speak up during discussions, I might speak to this student privately and encourage them to speak up more in class. Talking about math is a great way to learn, so it will be beneficial to their math learning, as well as their English practice and their ability to communicate well with their peers.

The final aspect of my ELL teaching plan is very important. I need to be aware of what my students are capable of and learn how to evaluate them effectively. I will need to constantly evaluate the math skills of the ELLs in my classes in order to see if they are in the correct courses. Some students will be right where they need to be, while others may need to be taking more advanced courses. Sometimes the barrier between ELLs and advanced courses is the lack of English-speaking abilities. Teachers and administrators cannot communicate well with the student and therefore assume they do not understand the math content, when they actually know the math and cannot show it.

Recall the story of Sylvia Celedón-Pattichis, who was labeled as an ESL as an eight-year-old due to not speaking English well. Despite her abilities in math and other subjects, Sylvia was not challenged in school because of her ESL label until a teacher of hers advocated for her. Being able to take higher-level courses changed the course of Sylvia's life (Celedón-Pattichis & Ramirez, 2012). The label ELL, ESL, or emergent bilingual follows some students far too long, which prevents them from taking courses that would truly benefit them or challenge them. That is why I will need to advocate for my students, so their label does not hold them back from all they can accomplish.

Conclusion

The purpose of this thesis is to determine tactical strategies for ELL inclusion in high school math instruction. Teachers are often not well-educated on how to teach the ELLs in their classrooms. I was able to analyze my key findings and establish crucial steps to be taken in teaching ELLs. I believe the most critical aspects of my findings can be narrowed down to five main ideas. First of all, accommodations are unique for every individual student. Each ELL has different needs based on their language proficiency, cultural background, and English

experience. Teachers need to keep in mind that ELL needs vary in order to make accommodations for each student. Second, discussions should take place in the form of a gradual progression. Class discussions should start in pairs, progress to small groups, and then advance to the whole-class setting. Next, teachers are able to utilize other teachers who have experience with an ELL in order to gain more perspectives in accommodations and strategies for working with the student. In addition, students need to be evaluated in math and placed in courses that are appropriate for their content knowledge. ELLs should not be placed in classes too easy or too challenging just because of their English skills, so assessment of each student's mathematics competence is needed. Lastly, it is important to create and maintain a good connection with the parents and guardians of ELLs, so communication between home and school is effective.

The limitations in my research revolved around time. After conducting my research, I did not look into practitioner research as was planned. It would have been interesting and beneficial to read teacher blogs and personal stories to gain more perspective about teaching practices that work for ELLs. Aside from this, a limitation for future research may be a lack of research in a certain area. At times, in researching a very specific aspect of teaching ELLs, I was unable to find adequate information. This may be an issue in digging deeper into my findings or the literature. Lastly, there are opposing viewpoints in some cases that can cause confusion in how certain ideas should be handled. One example has to do with group work. Some people would assume ELLs would be more comfortable in groups together if there are multiple ELLs in the class. However, I found more recommendations to spread ELLs out among groups, so they are with native English-speaking classmates and are challenged during discussions. There may be other instances where resources contradict each other because of the semi-controversial topic.

This research is significant because of the growing need in ability to teach ELLs. Since the number of ELLs in Iowa classrooms have been increasing consistently, there will continue to be more of these students involved in our classes. Educators will need to be prepared in teaching and including ELLs during instruction. ELLs should have equitable access to education through necessary accommodations and lesson adjustments. They should be able to participate alongside classmates in order to get the most out of their learning opportunities. Therefore, teachers must educate themselves on classroom inclusion and appropriate strategies for creating a safe, yet challenging, learning environment for their ELLs.

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