

Fostering High Expectations for ELLs in a Math Classroom

by
Madison Skala
August 2022

A capstone project submitted to the Department of Education and Human Development of
The College at Brockport, State University of New York in partial fulfillment of the requirements
for the degree of Master of Science in Education

Table of Contents

Abstract	3
Chapter 1: Introduction	4
Problem Statement	4
Significance of the Problem	5
Purpose	6
Summary	7
Chapter 2: Literature Review	9
Defining High Expectations	9
Low Expectations: What Causes Them?	10
Impact on ELLs	14
Changing Initial Teacher Perceptions of ELLs	18
Analysis	19
Instructional Approaches and Methodologies	20
Mathematical Linguistic Strategies	24
Conclusion	26
Chapter 3: Professional Development	28
Day 1: Defining High and Low Expectations	29
Day 2: Suggestions for Maintaining High Expectations for ELLs in Math	30
Day 3: Professional Development Reflection	33
Conclusion: Expected Outcomes	35
Chapter 4: Conclusion	36
Introduction	36
Conclusions	36
Implications for Student Learning	37
Implications for Teaching	38
Recommendations	39
Final Thoughts	39
References	40
Appendix A	45

Abstract

This capstone project aims to support teachers in fostering high expectations for ELLs in a math classroom. Fostering high expectations is a common issue in education due to teachers' beliefs that ELLs are not capable of succeeding because of their cultural and language backgrounds. The goal of this capstone project is to make teachers aware of this issue and how it can be resolved within their own classrooms. The literature review states that this is a common issue due to teachers' initial perceptions of ELLs and the inadequate teacher training programs. The issue is significant due to the impact it has on ELLs such as decreasing their motivation, self-efficacy, and academic achievement outcomes. This capstone project includes a Professional Development which guides teachers to reflect on their mindsets and implement effective teaching methodologies and approaches that foster high expectations within the math classroom.

Keywords: English Language Learners (ELLs), ESL (English as a Second Language), self-efficacy, achievement outcomes

Chapter 1: Introduction

Problem Statement

As a secondary mathematics teacher, I have experienced and observed the volatility of high and low expectations in an abundance of math classrooms. I am researching this topic because I have seen the effects expectations have on traditional students, on English Language Learners (ELLs) and academic achievements. Throughout my undergraduate teacher preparation program, I learned about the importance of setting high expectations for all of my students, especially ELLs, in order to encourage and motivate them to perform to the best of their ability in their academics. From a teaching perspective, my goal is to continue to learn new strategies in order to implement high expectations in the classroom. Bengtsson (2012) stated that “since 1998, 20% of students of foreign background constantly fail in math” and claims that this percentage is due to “social and pedagogical segregation” (p. 1). On that account, I find it critical to maintain high expectations in any math classroom. Thus ensuring, that all ELLs are receiving an equal opportunity to succeed and reach their own goals and aspirations.

In this capstone project, I will be using the following terms: English Language Learner (ELL), English as a Second Language (ESL), homonyms, English to Speakers of Other Languages (ESOL), self-efficacy, motivation, growth mindset, fixed mindset, Content and Language Integrated Learning (CLIL), Universal Design of Learning (UDL).

The overarching research question I address in this capstone project is: How can teachers foster high expectations for ELLs in a math classroom? Peterson et al. (2016) state that in “many countries, academic achievement levels of ethnic minority groups are lower than those of the ethnic majority” (p. 123). Additionally, Peterson et al. insist the prime reason for this educational achievement gap is due to the socioeconomic status of each student. I plan to guide general math

education teachers and ESL teachers through several professional development sessions to provide instruction with high expectations for all ELLs.

Significance of the Problem

According to Hamann and Reeves (2013), the number of ELLs in classrooms quickly expanded when the No Child Left Behind Act (NCLB) was enacted in 2002, resulting in “three and a half times as many [ELLs than] in 1991-1992” (p. 84). As the number of ELLs in all classrooms continues to rise, it is more important now than ever for math teachers to hold ELLs to high standards. If these issues remain unaddressed they will become more significant. When ELLs are not held to the same high standards as general education students the learning gap will widen within the respected district, state, and country. Peterson et al. (2016) claim that inconsistent expectations will continue to affect the learning gap. In fact, what students learn is solely dependent on the learning opportunities supplied by their teacher.

ELLs themselves are negatively affected by lowered expectations in a variety of areas. In general, mathematics is a subject where ELLs are consistently challenged due to their low proficiency in the English language. Thus, lowered expectations have a much larger impact on ELLs than on general education students because there is a language barrier. First, lowered expectations can result in lower student motivation and self-esteem (Bengtsson, 2012; Walker & Hwa Walker, 2021). If teachers have low expectations for ELLs, ELLs will perceive this as a sign that their teachers do not believe in their academic competence. This can result in ELLs having lower self-efficacy. Furthermore, Soland and Sandilos (2021) state that self-efficacy is “strongly associated with achievement” (p. 21). Consequently, lower self-efficacy can result in poor academic performance for ELLs (Jaekel, 2020). Additionally, lowered expectations can lead to the creation of an unwelcoming classroom climate that is hostile between the teacher and the

students (Walker & Hwa Walker, 2021). According to Sanders et al. (2018), a positive classroom environment is linked to higher levels of student accomplishment. A hostile classroom climate, on the other hand, often makes ELLs feel insecure and isolated in the classroom, school, and community (Suh, 2020). Lowered expectations can lead to ELLs performing poorly on high-stakes mathematics exams. Araujo (2017) explains that many math teachers hold “deficit beliefs” in regard to what ELLs are mathematically capable of doing. These deficit beliefs influence teachers to choose tasks that assess lower student expectations that do not meet the curriculum standards. Suppose ELLs are not provided with the opportunity to learn and demonstrate their knowledge within the expectations set for them. In that case, their opportunity of succeeding in high-stakes exams is minimal.

Purpose

If schools cannot maintain high expectations for ELLs, the negative results will completely change a student’s view of learning and motivation. My goal is to provide schools with a professional development (PD) to foster high academic expectations that positively affect all students, including ELLs. The audience of the PD will be secondary math teachers and English as a second language (ESL) teachers. The PD will be divided into three sessions that will take place between September and December.

The three sessions will contain the following topics: reasons why low expectations are created, the consequences of low expectations on ELL, the importance of setting high expectations, implementation of strategies to promote high expectations, and a reflection of all sessions. The participants will be collaborating with each other, reflecting on their own practices and mindsets, and implementing material from the PD into current lessons or units of study.

The first day of the PD will consist of participants reading an article that describes the

criteria for high expectations. After discussing the article, participants will analyze a video to determine when high expectations are and are not being set. Lastly, participants will learn the reason why high expectations are not being set. By the end of the first day, participants will be able to meet the learning goals such as defining high expectations, stating the causes and reasons as to why low expectations are set for ELLs, and stating the impact low expectations have on ELLs.

The second day of the PD will consist of participants taking a community bus ride that will be followed by a small and whole group discussion. Next, participants will learn the strategies used to foster high expectations such as Content and Integrated Learning (CLIL), Universal Design for Learning (UDL), word problem strategies, and vocabulary strategies. By the end of the second day, participants will be able to meet the learning goal of applying these strategies into any math lesson.

The third day of the PD will consist of participants reflecting and discussing their own classroom implications and findings from applying the day 2 strategies into their classroom. Following this discussion, participants will compare and discuss results from a survey they were asked to complete prior to day 1 and day 3. Participants will use the results to see if their initial beliefs have changed about their ELLs. By the end of the third day, participants will be able to meet the learning goal of reflecting on the findings and results from the survey and classroom implications.

Summary

Math is a demanding subject that can be challenging for many learners. More specifically, it can be a more significant challenge for ELLs because while they are learning the math content, they are also learning a new language. Since math is such a challenging subject to begin with, teachers need to be their students' source of motivation and positivity to help each

student believe in themselves and their own mathematical capability. Without the positive support and implementation of teaching practices, students will begin to feel less motivated, have a lowered self-esteem, and most likely show a decline in academic performance. Once the PD is completed, teachers should feel that they have a large role and impact on ELLs. Consequently, teachers should also feel confident in fostering high expectations for ELLs and continue to reflect on how they can consistently show ELLs they believe in them.

The remainder of this capstone project will contain three more chapters. Chapter 2 will contain a literature review discussing why low expectations are set, the negative results of low expectations, suggestions and classroom implications of setting high expectations, and the positive results from setting high expectations. Chapter 3 will consist of the PD, which will include a PowerPoint, surveys, activity handouts, and a reflection handout. Chapter 4 will contain a conclusion that will summarize the findings from the capstone project and PD. In addition, all PD materials will be included in the Appendix.

Chapter 2: Literature Review

Defining High Expectations

The overarching research question of this capstone project is: How can teachers foster high expectations for ELLs in a math classroom? In order to discuss the research and findings that are relevant to this research question, it is important first to discuss what are high expectations. It is essential that each district, grade level, and/or classroom defines the meaning of high expectations because it can be interpreted in a variety of different ways. It is also important to define these expectations because they can either harm or empower the student's learning and success (Shindler, 2020). The National Council of Teachers of Mathematics (NCTM, 2016) claims the following as their position on high expectations:

First, teachers must accept that all students have the ability to complete challenging mathematical tasks. Second, teachers must help students develop a confident and supportive self-identity relationship with math. Third, teachers must create curriculum and lesson plans that draw on students' existing knowledge and experiences. Fourth, teachers must structure lessons where students are responsible for reasoning and sense-making. Lastly, teachers must consider how activities and instruction might be enhanced to give more access, challenge, and support to all students. (p. 1)

While all of the above are being applied throughout a whole school year, teachers should also ensure that their students are meeting or exceeding the established state standards. Shindler (2020) completed a study comparing two classrooms where both teachers thought they were maintaining high expectations in the classroom. Ms. Smith designed her classroom with a strict grading policy, provides students equal access to all the material, and instills in her students that if they put in the time and effort they will receive positive results. However, Ms. Smith has the mindset that not all of her students will be capable of performing well. On the other hand, Ms.

Jones' classroom was designed where grades are not prioritized but the process and student implementation of skills, and student effort are of the essence. Ultimately, the comparison study reported that Ms. Smith's students developed a fixed mindset and Ms. Jones' students developed a growth mindset. Shindler concluded that any expectation will affect "how students view learning, motivation, others, the collective, [and] themselves" (p. 51). Hence, it is essential that teachers do everything possible to ensure that the expectations they set are both positive and appropriate.

Low Expectations: What Causes Them?

To set high expectations for ELLs in a math classroom, teachers must first understand what low expectations are and why they exist so that they do not set similar expectations. This section will cover the more in-depth causes of low expectations for ELLs in math.

Teachers' Perceptions of ELLs

It is essential for teachers to take into consideration how they view their students and more specifically, how they view students that come from lower socioeconomic households. Araujo (2017) conducted a study to observe how teachers use curriculum pertaining to ELLs and how the teachers' beliefs influenced the use of the curriculum. The study observed three math teachers that also were certified in English as a Second Language (ESL). All three math teachers taught at Title 1 high schools. Araujo found through observing all three teachers that their "beliefs may lead to limited opportunities for students to engage in cognitively demanding mathematics tasks" (p. 368). All three teachers assigned tasks to ELLs where all they needed to do was find a numerical answer or a solution without having to explain their response. Araujo concluded that all three teachers assigned tasks to develop ELLs mathematical vocabulary but did not focus on designing tasks that were cognitively demanding. Ultimately, Araujo claimed these tasks were not providing ELLs with multiple opportunities to reach the demanding

expectations in math because the teachers were too focused on ELLs language proficiency levels which took time away from teaching ELLs the challenging math concepts. Yeong et al. (2020) conducted a study to examine how teachers' views change after being taught how to teach ELLs in math. In this study, Yeong et al. administered a qualitative pre-survey and a qualitative post-survey to determine the results of the study. The findings from the pre-survey consisted of teachers having negative preconceived notions about ELLs. Teachers believed that ELLs could not take part in class discussions, that their home languages hindered their capacity to learn in the classroom, and that the mathematical discourse used words that ELLs did not already have in their vocabulary bank. According to the post-survey results, teachers now understand the difficulties ELLs face and believe that with adequate instruction, ELLs could achieve academic success in all areas.

Although many teachers believed that ELLs performed poorly in math, Anhalt and Pérez (2013) contradicted that belief and found that some teachers had the preconceived perception that ELLs had a strength in math because it was a universal language. Anhalt and Pérez designed a study where surveys were administered to 68 math teachers in Arizona, New Mexico, and California. The goal of this study was to examine concerns teachers had about teaching math to ELLs. The surveys focused on social issues such as stereotypes and discrimination, teaching issues such as strategies, methods, and tools, and lastly the impact of student learning factors such as ELLs home environment and families. Anhalt and Pérez discovered that many teachers were more concerned with the techniques and resources used to teach ELLs math than with the social contexts or student learning variables. In addition, the data negates the concern that teachers were not prepared to reach the needs of ELLs. Instead, the findings showed that teachers believed that multilingual students working on a mathematical task are able to easily manage the

social and higher-order thinking aspects of a mathematical discussion. Teachers formed this idea because they believe that ELLs have a wide variety of linguistic resources. This altered belief has come to existence as a way for teachers to alleviate the stress that is put on them to help ELLs succeed.

Pettit (2019) designed a questionnaire called *The Mathematics Teachers' Beliefs About English Language Learners* to determine the factors that influence beliefs about ELLs and their mathematical ability. The questionnaire was administered to 439 middle school math teachers in Georgia. One major finding that influenced teachers to have low expectations for ELLs was the lack of training and preparation to teach ELLs. Insufficient teacher preparation programs for ELLs will be discussed more in-depth in the following section. Another finding Pettit observed through the questionnaire was the gender of the teacher educating ELLs. Pettit found that female teachers are more likely to hold high expectations for ELLs than male teachers. More specifically, female math teachers were more willing to modify assignments to meet the needs of ELLs rather than male teachers.

Overall, there are a wide variety of factors that sustain the preconceived notions of ELLs and their ability to perform well within any math course. Understanding these beliefs and myths is critical in order for teachers to steer away from this negative fixed mindset and strive towards a growth mindset where all ELLs are held to high expectations.

Insufficient Teacher Preparation Programs

Many teachers immediately set low expectations for ELLs because they are not prepared on how to best educate them (Araujo, 2017; Suh, 2020). When teachers do not receive adequate training, they have a more challenging time developing a lesson because they are not sure what ELLs do and do not know. Inadequate training will also result in teachers being unprepared for

the classroom supports that they are responsible for providing to assist ELLs. Additionally, teachers will not be equipped to meet the language and subject-matter requirements of ELLs (Rodriguez et al., 2022). This lack of preparedness leads to more permanent effects on ELLs such as a greater dropout rate.

Understanding the reasons why teachers are inadequately prepared to instruct ELLs is fundamental. Harklau and Ford (2021) produced an article that analyzes the United States language policies enacted for ELLs and their teachers. Harklau and Ford argue that the numerous “language education policies are not merely handed down in a hierarchical or rational fashion” (p. 146). In fact, the language education policies are determined by a variety of different federal, state, and local levels in the education field which do not take into account the perspectives of language acquisition teachers. Therefore, the issue of inadequate teacher preparation programs is emphasized because teacher preparation programs are inconsistent. For instance, some programs require more English to Speakers of Other Languages (ESOL) courses than other programs. Furthermore, educators who had undergone some form of ESOL training showed much more favorable attitudes toward teaching ELLs than teachers who had not (Pettit, 2019). Without consistent programs to prepare teachers, more and more schools will hire instructors who are not certified and qualified to work with ELLs and therefore will not know how to set high expectations for ELLs.

Ross (2013) developed a study that focused on how modifying a teacher's level of self-efficacy, and professional development opportunities affected student achievement. According to the findings, the number of ELLs has grown by more than half in the last five years, but professional development opportunities and support for working ELLs in mainstream mathematics teachers have not kept up with this expansion. Ross found that “even though 41%

of teacher respondents had ELLs in their classes, only 12.5% of those teachers receive eight or more hours of training” (p. 88). The results also show that having more years of experience does not significantly boost a teacher's self-efficacy while working with ELLs. Ultimately, the length and depth of teacher training in any subject or language can greatly impact the achievement outcomes of the respected students.

Impact on ELLs

The effect of math teacher expectations is a topic continuously discussed since it impacts ELLs in a significantly negative way. Low expectations will not only cause current issues but can also affect ELLs and their future outside of an academic setting. The following section will discuss a few impacts on ELLs when high or low expectations are set by their teachers.

Self-Efficacy and Motivation

Walker and Hwa Walker (2021) completed a study on how a first-year teacher’s beliefs enabled ELLs to score outstanding academic scores on standardized tests. The teacher focused on in this study is, Ms. Jazmine Espinoza, a math teacher at Sunnyside High School. The findings of the study indicated that Ms. Espinoza’s class scored significantly better than other classes at Sunnyside High School. Ms. Espinoza was able to hold her students to high expectations and help them perform well on standardized tests in a variety of important ways. First, Ms. Espinoza made it her mission to get to know her students and develop a purpose for each lesson that she taught. Ms. Espinoza found through purposeful and personalized instruction, she could easily motivate all students, especially ones that come from low socioeconomic backgrounds. To continue to motivate students, Ms. Espinoza showed motivational videos by famous speakers before each lesson to help bring all students’ spirits up. Second, Ms. Espinoza found it critical to foster positive feedback to her students. Through the utilization of positive feedback, Ms. Espinoza was able to see more class participation and engagement. Walker and

Hwa Walker's study confirmed that classrooms that did not receive empowering care like Ms. Espinoza did not perform as well on standardized tests. Thus, without upholding positive beliefs and a positive learning environment, students will experience a loss of motivation and diminished self-efficacy. Soland and Sandilos (2021) define self-efficacy as "how individuals judge their own abilities to perform certain tasks or actions" (p. 23). In the event low expectations are set, ELLs will begin to notice that they have less time to respond to class questions, will not make as much eye contact with their teachers and peers, and will feel a reduced sense of belonging while interacting with others (Peterson et al., 2016).

Bengtsson (2012) found similar findings through a case study of four mathematics classrooms. This study focused on the type of classroom environment and mathematical instruction that led to high student motivation and self-efficacy, which ultimately leads to higher academic performance. Bengtsson collected data through interviews, classroom observations, and informal conversations with teachers. The findings of this data reported that teachers who have a positive attitude toward teaching and their students will develop high expectations for ELLs. Although, Bengtsson asserts that ELLs can develop a negative self-image of themselves if they do not have positive support and motivation from their teachers. Another factor that led to students meeting high expectations was the multiple opportunities teachers provided for students to practice the academic discourse and communicate with their peers and teacher. This enables all ELLs to feel empowered and knows that their voices are being heard. Students' level of self-efficacy will dramatically increase when they realize they are accepted for who they are and the way they participate in class.

Soland and Sandilos (2021) perform a study to examine the relationship between self-efficacy and academic achievement for ELLs in fifth to eighth grade. Soland and Sandilos

found that ELLs who had higher levels of self-efficacy establish more ambitious academic goals, place higher importance on academic success, devote significantly more time to studying, and perform better academically. The findings included information on the causes of low self-efficacy in ELLs. First, removing ELLs from regular classes to receive personalized instruction can make them question their own intelligence. Second, ELLs that are in the middle school level have a more challenging time increasing their motivation and self-efficacy due to their sensitivity and developmental changes as a person.

If teachers are able to help ELLs develop a stronger level of self-efficacy, then ELLs will be more motivated to challenge themselves and complete tasks that are not straightforward. NCTM (2016) acknowledges that teachers can confirm they are setting high expectations when they are providing their students with challenging tasks that encourage them to problem solve and reason.

Achievement Outcomes

Low expectations for ELLs will have an adverse effect on their motivation and self-efficacy, which will, in turn, influence ELLs academic achievement and futures outside of the classroom (Soland & Sandilos, 2021). To put it in context, the classroom atmosphere can be impacted if ELLs think their teachers do not believe they can succeed and accomplish challenging assignments. Sanders et al. (2018) completed a study to determine whether school climate had a different relationship with academic achievement for at-risk students (students with disabilities and ELLS) and non-at-risk students (general education students). The study collected data from the Northwest Evaluation Association's math test scores as well as student surveys on the school climate. The findings revealed that high school ELLs who had a negative view of the school climate survey scored nine points lower on their math scores than their non-ELL peers.

Although, ELLs who had a positive view of the school climate did not display a significant difference in their math scores compared to non-ELL peers. Thus, Sanders et al. found a correlation between school climate and academic achievement. In fact, this correlation was found to be even more vital for low social and emotional status and racial minority students. Similarly, Kim et al. (2015) conducted a study that researched the relationship between teacher-student working relationships and dropout rates. According to the study, the dropout rate was lowered by 50% when both students and teachers highly rated the quality of the teachers.

Dropping out of high school can be detrimental to ELLs futures. It is crucial for teachers to comprehend how their position as educators could affect the high school dropout rate for ELLs. Furthermore, Kim et al. (2015) in their study of the relationship between teacher-student relationships and dropout rates claim that the overall dropout rate has decreased throughout the years. The decreased dropout rate, however, solely applies to white students and excludes all other students. Thus, Kim et al. claim it is more likely for ELLs to drop out of school for many purposes, including low teacher expectations. Rodriguez et al. (2022) conducted a study that examined the factors that can increase the dropout rate for ELLs. Data was collected through a questionnaire that was administered to administrators, teachers, and counselors who answered the items based on their own perceptions of ELLs. According to the findings, the academic challenges that ELLs face which could lead to dropping out are passing the Regents, inadequate academic preparation, lack of English language proficiency, difficulty in catching up on content and language, and receiving a poor education prior to attending school in the USA. Thus, dropping out of high school could harm ELLs' chances of finding a job that would enable them to leave their low socioeconomic living situations. Ultimately, dropping out of high school will lead to fewer opportunities for ELLs in a non-academic setting.

Changing Initial Teacher Perceptions of ELLs

Even if there are numerous effective teaching strategies and educational theories that can support teachers in upholding high standards for ELLs, positive attitudes and views about ELLs among teachers are still crucial for the success of all classroom outcomes. Any school is capable of contributing to changing unfavorable views and perceptions through strong school leadership.

Rodriguez (2012) conducted a study on Principal Morales, a first-year principal at Esperanza Elementary, who experienced teachers' negative beliefs, attitudes, and perceptions of their students. The elementary school consisted of more than 75% of kids in danger of dropping out in the future and more than 80% of the school's students were identified as ELLs. In order to generate high expectations for each and every ELL, Principal Morales established the goal of influencing the teachers' perspectives on ELL students. To achieve her goal, Principal Morales organized a "Neighborhood Bus Tour" that involved teachers visiting the homes of their students as well as meeting with a small number of parents to foster communication between teachers and parents. Following the tour, Principal Morales facilitated a discussion in which instructors asserted that their initial attitudes and opinions regarding ELLs greatly changed after learning about their students' histories and after building strong ties with their families.

Gann et al. (2016) support Principal Morales's goal of helping teachers change their mindsets about ELLs. Gann et al. found it important to help math teachers become aware of their negative viewpoints toward ELLs. Thus, Gann et al. created a survey known as *Mathematics Teachers' Beliefs About English Language Learners* (MTBELL). The MTBELL survey objective was to evaluate math teachers' culturally responsive teaching philosophies and methods, their explanations for why ELLs learn or do not acquire language and mathematics, and the assistance needed for teachers to effectively satisfy ELLs' demands in their classes. Overall, the survey

allowed teachers to become fully aware of the prior beliefs they had for ELLs in their math classrooms and how they negatively affected the instruction, resources, and decision-making of the math teachers. Gann et al. explained that once teachers were able to understand and see their negative perceptions, they took more careful consideration in teaching ELLs math.

Analysis

The literature review has so far covered the reasons why teachers may establish low or high expectations for ELLs in math classes, as well as the benefits and drawbacks of each. The results of the several publications that were studied will be discussed in this section along with advice on how to confirm that high expectations are set, and the practical tools and resources that can assist teachers in upholding high standards for ELLs in math classes. According to Shindler (2020), “what it means to demonstrate high expectations varies greatly from teacher to teacher” (p. 50). Therefore, there is not one tool that every district in every state can use because not only do expectations vary from teacher to teacher but, standards vary from state to state. Additionally, Gann et al. (2016) claim there is less research on math and ELLs compared to any other subject. The reason for this lack of research could be due to the myth that there is no language barrier in the mathematical discourse.

Instructional Approaches and Methodologies

Content and Language Integrated Learning

Akbarov et. al. (2018) state that Content and Language Integrated Learning (CLIL) is defined as “learning both language and contents of a particular school subject or academic course” (p. 1). Akbarov et. al. explains the four pillars of CLIL are (1) content, (2) cognition, (3) communication, and (4) culture/community. Adding that all four pillars should be addressed throughout each math lesson to fully and effectively implement CLIL correctly.

CLIL can be an effective instructional approach for maintaining high expectations because the following studies have claimed that it leads to higher learning outcomes for ELLs. Pladevall-Ballester (2014) conducted a study on the perceptions of students, teachers, and parents through surveys and questionnaires after CLIL has been implemented for one year. The findings explained that CLIL teachers observed ELLs ability to express themselves using the correct academic discourse and demonstrated higher social and cognitive capacities. However, the parents of the ELLs, and teachers who all had some type of experience in a CLIL classroom found varying opinions. Some of the ELLs that have been interviewed who have experienced a CLIL classroom shared opinions stating “they [the students] cannot follow the classes because they do not understand the teacher or the concepts explained and they are not satisfied with the experience” (p. 49). Although, the parents of these ELLs believed that their children enjoyed a CLIL classroom experience because the assignments were engaging, challenging, and overall learned more information. The teachers ultimately agreed with the parents expressing that the students demonstrated higher engagement levels and found tasks to be more challenging which led students to see their capability of “understanding and transmitting concepts in English, which

motivated them further” (p. 50). Thus, CLIL has been known to be beneficial for some math classrooms and a disadvantage for others.

Jaekel (2020) explains that CLIL is purposeful in helping ELLs take control of their content and language learning in the classroom. Jaekel completed a comparative study of ELLs in a CLIL class and another group of ELLs in an English as a Foreign Language (EFL) class using a structural equation modeling (SEM) system. Through the case study, Jaekel learned that CLIL students demonstrated higher self-efficacy levels than EFL students. Jaekel further discussed that the reason for this finding was that CLIL students had higher cognitive tasks and supplemental assignments.

Surmont et. al. (2016) also completed a comparative study similar to Jaekel (2020) with a group of ELLs in a CLIL math class and a group of ELLs in a traditional math class. In this study, all students completed an exam called Mathematical Assessment Test- Help prior to the academic year beginning. At the start of the year, the students were split into two different math classes, CLIL, and non-CLIL. The exam was administered two more times throughout the school year, after three months and after ten months. Prior to the start of the school year, all students performed at the same level for the first attempt of the math exam. The second and third attempts of CLIL students significantly outperformed non-CLIL students. Surmont et. al. stress that CLIL helps increase ELLs metalinguistic awareness which in return provides an advantage for ELLs in any math course. Furthermore, CLIL is student-centered and emphasizes active student learning. Enabling ELLs to take control of their learning is one way to improve their self-efficacy and inspire them to meet the high expectations that are set for them. This demonstrates that holding ELLs to higher standards prompts them to perform to the best of their abilities.

In a similar study, Ouazizi (2016) found that CLIL students significantly outperformed non-CLIL students on a quadratic equations exam. Ouazizi argues that CLIL showed higher performance because “the fact that CLIL education offers ‘repetition’ of the syllabus learned in the mother tongue gives additional time and opportunity to the students to revise and fix what they have been learning in their mother tongue” (p.128). Overall, this suggests that if ELLs are challenged more and held to higher standards by their teachers, they have the opportunity of performing significantly better than where they initially started.

Although CLIL seems to be an effective teaching methodology to implement in the classroom to help maintain high expectations for ELLs, there are some downfalls that come along with it. Pladevall-Ballester (2014) claims that CLIL can be detrimental to ELLs when implemented at a school that has minimum knowledge and training on how it should be applied in a classroom. When CLIL is applied incorrectly ELLs can suffer from developing their L1 skills at the expected pace, linguistic capabilities, and cognitive capabilities.

Universal Design for Learning

As presented in Chapter 1, all ELLs must be held to high standards in order to excel in the math curriculum and acquire the English language. It is imperative for math teachers to construct lessons that are personalized to each individual set of needs so that ELLs have a fair chance of understanding and acquiring new content and language. One of the major reasons why ELLs perform poorly in their academics is due to teachers not knowing the right tools and curriculum to implement in the classroom (Lopes-Murphy, 2012).

An educational theory and practice that addresses the specific standards ELLs need to meet is called the Universal Design of Learning (UDL). UDL is known as “maximizing accessibility and minimizing barriers to learning while also engaging and challenging students”

(Doran, 2015, p. 3). Minimizing barriers and challenging students is the goal of fostering high expectations for students. UDL has many components but the main ones to include in math instruction are as follows: providing support to students when necessary, reducing the learning barriers, using a variety of ways to teach information, using a variety of ways for students to demonstrate information, teaching material through students own interests and cultures, and lastly presenting awareness on students diverse backgrounds and cultures (Lopes-Murphy, 2012).

UDL is an essential framework to implement in a math classroom containing ELLs because it addresses many of the challenges they face that were mentioned in Chapter 1. According to Lopes-Murphy (2012) “accessibility and engagement are two of the most important tenets in UDL” (p. 228). These two tenets address the challenge of student motivation and self-esteem. Providing a variety of activities for students to pick from can increase students' motivation since they will feel in charge of their own learning (Doran, 2015). When ELLs choose the activity they want to perform, they will feel more confident in themselves because they know they are capable of completing it.

Furthermore, providing ELLs with options can help them understand that their teacher wants them to succeed, resulting in a better student-teacher relationship and a more positive classroom environment. King-Sears and Johnson (2020) report that academic achievement and test scores will improve when UDL is implemented. To support the claim, King-Sears and Johnson completed a comparison study. The subjects of the study were students with and without learning differences (LD). The researchers administered the same pre and post-test to all the participants. After the pre-test was administered, King-Sears and Johnson taught students with LDs by using the UDL framework and taught students without an LD through the usual teaching techniques used throughout the school year. In the post-test, students with learning differences

who received UDL instruction outscored those without a learning difference considerably. As a result of UDL instruction, ELLs improved performance on assignments and high-stakes assessments.

Overall, UDL can be used in the classroom to counteract the detrimental effects of teachers' low expectations for ELLs. In some ways, the UDL framework can be used in the classroom to help teachers avoid establishing low expectations for their ELL students.

Mathematical Linguistic Strategies

Math is a diverse subject that can include a variety of topics like Algebra, Geometry, Trigonometry, Statistics, etc. Students will also face the challenge of practicing and combining conceptual understandings of more than one topic together. Word problems are just one type of math problem but strategies, like pre-teaching, can be implementations applied to any math topic. Thus, the remainder of this section will discuss the variety of teaching strategies that can be applied to any math topic that gives ELLs the opportunity to reach their state standards and teacher expectations.

It is of great importance for teachers to ensure that all ELLs are given the opportunity to reach high expectations. In accordance with Wilson (2016), ELLs initially already face a variety of challenges in math classrooms such as the type of language used in instruction, ELLs limited English language proficiency, and the intricate language used in word problems and throughout instruction. Sanford et. al. (2020) clarifies that students must understand terms that have specific meanings, terms that are symbolical, and additionally polysemous words, homophones that are connected with daily terms, and informal terms.

Roberts and Truxaw (2013) provide the following example confirming that the language component in math can be challenging for ELLs:

“... Jorge said, “Last year you said that the base was the number in a power that was not the exponent. I do not see the exponent, so I do not know where the base is.” Aha! I had said something like that in algebra class the previous year. However, I had never thought about the two different uses of the word base within mathematics”. (p. 29)

This is just one of the many times ELLs, and even general education students will face this challenge. It is critical that teachers address these language barriers so that ELL students have the same opportunities for success as general education students.

Pre-Teaching Strategy

Ross (2013) explains that not only can math be challenging for ELLs but it can also be challenging for teachers to instruct ELLs because the math content language differs vastly from the English language. Leali et al. (2012) agree with Ross by explaining that many types of math questions are language-specific. Many teachers lower their expectations for ELLs when it comes to word problems because they immediately think the language used in the problem is too difficult for them to completely understand. In order to allow ELLs to reach their full potential, teachers need to grant them access to resources and tools that will assist them in succeeding. Leali et al. suggest when teaching word problems to ELLs, teachers should ensure that they provide sufficient background knowledge that pertains to the word problem so ELLs can better understand what is being asked of them. Furthermore, teachers should find word problems that relate to daily tasks so ELLs have the opportunity to immerse in their new culture. Sanford et al. (2020) and Roberts and Truxaw (2013) insist that for ELLs to succeed with word problems teachers should pre-teach the concepts and skills prior to the lessons and teachers should provide

ELLs with academic language support to assist ELLs in solving word problems. The benefit of pre-teaching concepts and skills was highlighted by Orosco et al. (2013) since research results of this implementation showed that ELLs were far more capable of understanding and solving word problems.

Vocabulary is an essential component to comprehend when practicing math. For ELLs, it can be more challenging due to their English language proficiency level. Vocabulary plays an important role in most math problems because it guides students' direction on how to solve the problem. Thus, when teachers set high expectations for their students, they are also responsible for providing students with a fair opportunity of comprehending the material to reach their learning needs. Well-researched strategies such as using word walls, graphic organizers, and vocabulary journals are all strategies that teachers can use to provide support and resources to ELLs (Roberts & Truxaw, 2013). A word wall is an effective strategy that uses students' backgrounds and prior knowledge. Activating ELLs prior knowledge is a main component of the UDL framework and has been proven to help ELLs remember content clearer (Ross, 2013; Wilson, 2016).

Conclusion

There are many components to consider when maintaining high expectations for ELLs in a challenging class such as math. It is of great importance for math teachers to understand that the expectations they set for ELLs play a major role in whether they have a successful academic career and future. It is critical that teachers understand what setting high expectations mean so they know how to set them for each individual class. It is also crucial for teachers to understand what causes others to set low expectations in the classroom and how these low expectations affect ELLs in the classroom. Understanding this cause will help prevent teachers from setting

these same expectations. Furthermore, teachers should also understand the positive impacts that high expectations have on ELLs because this will encourage teachers to continue to set them. Lastly, teachers must be able to understand the different educational theories, practices, and strategies in order to provide ELLs with equal opportunities to demonstrate their learning and understanding of the material. Overall, every teacher has the ability to set high expectations for ELLs and every teacher has the resources and knowledge to implement strategies and foster connections with ELLs to help them strive for success.

In the following chapter, I will present a professional development series regarding the overarching research question: How can teachers foster high expectations for ELLs in a math classroom? The professional development is designed for all math teachers and ESL teachers at the secondary level. The goal of this professional development is to educate teachers on the positive and negative effects of setting high and low expectations, as well as suggestions and strategies to mitigate this educational issue.

Chapter 3: Professional Development

In this chapter, the components of a professional development (PD) will be covered by the information contained in chapters one and two. The purpose of the professional development is to help make participants aware of how to foster high expectations for ELLs in a math classroom. Participants will have access to strategies and resources to create and confirm they are holding ELLs to high expectations in their math class. The professional development includes three sessions. Days 1 and 3 will be an hour each and Day 2 will be two hours. The PD will take place at a Junior-Senior High School. The first two sessions will be held at the first two mathematics department meetings in September. The last session will be scheduled in November at a regularly scheduled math department meeting. The PD is required for all math teachers and ESL teachers in the building. However, all other subject teachers, administrators, and paraprofessionals are welcome to attend at their discretion.

The handouts and tools that will be used for the PD are labeled chronologically and placed in the appendix of this capstone. The following sections in this chapter will discuss the agendas of what will occur during each session. To summarize, the first session, Day 1, will discuss the definition of high expectations in New York State, the causes of low expectations, and the effects low expectations have on ELLs. Day 2 of the PD will discuss initial teacher perceptions of ELLs and suggestions to maintain high expectations for ELLs. Day 3 will be a reflection where participants will share their findings and opinions after implementing strategies from the PD in their classrooms. Day 3 will also discuss the results and findings of the PD overall.

Day 1: Defining High and Low Expectations

On Day 1, participants will arrive at the PD with a completed *Mathematics Teachers' Beliefs About English Language Learners* (MTBELL) survey. Gann et al. (2016) invented this survey arguing that it was needed due to the limited existence of research on “secondary mathematics teachers’ beliefs, attitudes, and knowledge base regarding ELLs” (p. 85).

Participants will view the opening slide of the PowerPoint and follow directions to input their survey answers into the Google Form. Participants will retake the survey as a post-survey prior to Day 3 in November. The results from Day 1 and Day 3 will be compared on Day 3 to measure and observe any changes in teachers’ initial perceptions of ELLs. Once all survey answers are submitted, the presenter will review the daily agenda (see Figure 1) and discuss the learning objectives of the day.

Next, the presenter will hand out the National Council of Teachers of Mathematics (NCTM) position on high expectations. The purpose of this article aims to help participants understand what high expectations are defined as. The presenter will provide participants with five minutes to read and annotate the short article. After all participants read and annotate the article, the presenter will briefly discuss the five components of fostering high expectations through the PowerPoint slides. Next, the presenter will ask participants to form groups of four. Participants will watch a video and complete the math scenario checklist (see Figure 2) to differentiate when the teacher is and is not meeting the NCTM high expectation criteria. The presenter will provide participants with 10 minutes after the video to fill out the checklist and communicate with group members. This activity was designed based on the methodology in Shindler (2020) where the author compared two teachers who both thought they were setting

high expectations in their classes. After 10 minutes, the presenter will ask groups to volunteer their responses for each criterion.

Once participants have a strong understanding of what high expectations are, they will begin to brainstorm why low expectations are set for ELLs. The presenter will pair one math teacher with one ESL teacher. Similarly, other participants of the PD who are not math or ESL will be paired with participants from other content subject areas. The purpose of this grouping will allow a wider perspective and lens when brainstorming. The presenter will provide five minutes for participants to work together and write down a list of their ideas (see Figure 3). After five minutes, the presenter will ask pairs to share new suggestions. Following the volunteer responses, the presenter will display and discuss the PowerPoint slides which contain the causes of why low expectations are set for ELLs.

Lastly, the following PowerPoint slides will contain content on how these causes affect ELLs. Once all slides have been discussed, the presenter will show a link that will help participants understand the severity and importance of this issue and its effects on ELLs. Before the first session ends, the presenter will hand out an exit ticket (see Figure 4) that participants are expected to take with them and bring back the following session. The exit ticket asks participants to reflect and share a cause, effect, or both that was surprising to them or made them think differently.

Day 2: Suggestions for Maintaining High Expectations for ELLs in Math

On Day 2, participants will have had 2 weeks to reflect on the information from Day 1. Participants will bring to PD on Day 2 the exit ticket from the previous session. The presenter will ask for volunteers to share responses and facilitate a discussion. After the discussion, the presenter will review the agenda (see Figure 5) and the learning objectives of the day. In

addition, the presenter will go more in-depth about the meaning behind the activity, *Community Bus Ride*. The presenter will inform participants that they will be taking a bus ride through their students' communities. This idea is adapted from the study by Rodriguez (2012). This activity is part of the PD because in the Rodriguez study, the results shared that the tour broadened teachers' perspectives on ELLs and valued developing relationships with ELLs' families and the local community. This understanding paved the way to help teachers accept ELLs' potential for success. On the bus ride, teachers will view the neighborhoods, parks, towns, and stores. Teachers will also make a stop at the public library where five parents will be waiting to converse with the PD participants. The focus of the conversation will be the neighborhood rather than their child. Participants will return to the professional development once the bus tour is completed, and the presenter will lead a debriefing discussion about what they saw, thoughts, altered perceptions, interactions with parents of students, etc. The expected outcome of this activity is that participants will be able to understand how their beliefs affect them and how those beliefs may be keeping them from setting high expectations for ELLs in the classroom.

Following the bus ride discussion, the presenter will continue to share information on how to help teachers foster high expectations for ELLs in the classroom through the Powerpoint. First, the presenter will discuss the Content and Integrated Language Learning (CLIL) teaching approach. CLIL is supported by many researchers as beneficial to ELLs (Harrop, 2012; Jaekel, 2020; Ouazizi, 2016; Pladevall-Ballester, 2014; Surmont et. al., 2016). The Powerpoint will review the four main pillars of CLIL, the benefits the approach has on ELLs, and the disadvantages the approach may have on ELLs. In order to encourage audience members to keep thinking and learning actively throughout the session, the presenter will ask participants to record notes (see Figure 6).

Next, the presenter will begin to share information about Universal Design for Learning (UDL). Similarly, many studies think UDL is a successful teaching strategy that addresses all of ELLs' demands while also holding them to high expectations (Doran, 2015; King-Sears and Johnson, 2020; Lopes-Murphy, 2012). The advantages of UDL will be discussed throughout the presentation, as well as the King-Sears and Johnson comparative study. After all information on UDL has been shared and all questions have been asked, the presenter will ask the participants to examine the CAST website which contains guidelines for applying UDL in the classroom. Participants will be responsible for writing down the options that they have not yet implemented in the classroom (see Figure 7). Next, the presenter will have participants form into groups. For example, all Algebra I math teachers and push-in Algebra 1 ESL teachers will be in a group. Similarly, all Geometry math teachers and push-in Geometry ESL teachers will be another group. Groups will take ten minutes to discuss and identify common guidelines that have not been applied in the classroom yet. Then, groups will come up with creative strategies for incorporating these guidelines into forthcoming math lessons. The goal is to make participants more aware of their strengths, and areas where to improve instructional opportunities for all students. Participants will also utilize these results to complete an activity, which will be covered further in this section.

The last portion of the Day 2 presentation will consist of strategies and methods used for specific mathematical problem-solving questions. Teachers will receive a note catcher with slide information (see Figure 8). The strategies and methods taught are useful in helping teachers ensure they are providing ELLs with enough resources and opportunities to reach high expectations that are set for them. The presentation includes strategies on how to teach word problems and mathematical vocabulary terms to ELLs. Roberts and Truxaw (2013) state the

importance of learning these strategies because math vocabulary can be harder to learn than any other subject area due to the following reasons: (1) vocabulary and its definitions contain technical phrases and terms, (2) concepts in math can be solved and represented in a variety of ways, (3) math terms have a variety of different meanings in the math discourse, (4) many math terms also have different meanings in everyday life, and (5) some terminology can be confusing because they resemble words in ELLs native languages.

After all content has been reviewed thoroughly from the presentation slides, the presenter will discuss the exit ticket and aim for the upcoming session. The presenter will explain to teachers that they have a month to implement strategies in lessons or units. Participants are responsible for implementing CLIL, the UDL guidelines they wrote down (see Figure 7) , and the specific mathematical strategies for word problems and vocabulary instruction. Participants will fill out the activity, *Classroom Implication Notes* (see Figure 9), and bring the worksheet back to the last session in November. Participants will also be asked to complete the *Mathematics Teachers' Beliefs About English Language Learners* (MTBELL) survey and bring their results to the November session as well.

Day 3: Professional Development Reflection

Day 3 is the last session of the PD to prepare participants for setting high expectations for ELLs in their classrooms. The third day will take place a month after the second session in order to allow participants to implement new strategies and mindsets in their classrooms. The purpose of this last session is to reflect on what participants learned as a group, individually, and if any mindsets have been altered since the first session. On Day 3, participants will arrive at the PD with the *Mathematics Teachers' Beliefs About English Language Learners* (MTBELL) survey completed again for a second time. Participants will view the opening slide of the PowerPoint

and follow directions to input their survey answers into the Google Form. Once all survey answers are submitted, the presenter will review the daily agenda (see Figure 10) and discuss the learning objective of the day; Participants of the PD will be able to reflect on the results and findings from the MTBELL survey and classroom implications.

Next, the presenter will create small groups for participants to explain their findings and reflections from implementing the suggestions in their classroom using the Classroom Implication Notes from PD Day 2 (see Figure 9). The presenter will provide groups with 20 minutes to identify any similarities and differences from their classroom application. Once all groups have thoroughly discussed their findings, the presenter will facilitate a whole group discussion where participants will volunteer and share their individual findings, and the similarities and differences from the group findings. According to Pladevall-Ballester (2014), some challenges that teachers face are due to minimum knowledge of how to implement techniques/approaches in the classroom. Although each implementation is discussed in the professional development, it is not taught as an in-depth application. Similarly from the research mentioned in chapter two, some teachers may find that the classroom applications have positive effects on ELLs whereas other teachers may observe that ELLs perceive these applications negatively.

Before the PD is officially completed, the presenter will show the data from the Day 1 MTBELL survey and the results from the Day 3 MTBELL survey. As a whole group, the presenter and participants will identify the differences in responses as well as the responses that stayed consistent throughout this past month and a half. The presenter will facilitate a discussion on why there were and were no changes in the survey results. The speaker will lead the audience toward the notion that one's own mindset plays a significant role in defining expectations for

ELLs and the opportunities one offers ELLs. After the survey discussion, the presenter will distribute the exit ticket (see Figure 11) in which participants will reflect on the PD as a whole. The presenter will thank all participants for attending the PD and will prompt them to continue learning about ELLs and applying these practices in their own classrooms. Before the participants leave the PD, the presenter will request they email or turn in the exit ticket by December.

Conclusion: Expected Outcomes

The purpose of this PD is to help all teachers and educational personnel understand the importance of setting high expectations for ELLs specifically in the math classroom. The PD was opened to all educational personnel because many of the strategies that were applied to the math classroom can also be applied to any other subject-based classroom. After the PD, participants should have a strong understanding of the negative effects low expectations have on ELLs. Participants should also understand the reasons why low expectations are set for ELLs and what strategies and tools can be used to prevent these expectations from being set. Ultimately, participants learned about a variety of mathematical tools and strategies, teaching approaches, and teaching methods that can be used in the classroom to maintain and foster expectations for all students, including ELLs.

In Chapter 4, the final chapter, I will summarize the takeaways from chapters 1, 2, and 3 in regard to my overarching research question: How can teachers foster high expectations for ELLs in a math classroom? Chapter 4 will also include how the information discussed in this capstone project is beneficial for both students and teachers.

Chapter 4: Conclusion

Introduction

Throughout my experience as a math teacher, I have seen the significant effects that low expectations have on ELLs and their academic outcomes in a math classroom. Therefore, it is critical for teachers to consider, how to foster high expectations for ELLs in a math classroom? It is critical for teachers to understand the many barriers ELLs face in an educational setting and how these barriers might affect teachers' initial beliefs about ELLs and their ability to succeed in academics. In this capstone project, we have discussed the reasons why low expectations are set for ELLs and how we can address these reasons in order to prevent this pattern from reoccurring in future ELLs' education.

Conclusions

Throughout the capstone project, the research has found the significant impact that initial teacher beliefs have on establishing reasonable yet challenging expectations for ELLs in the math classroom. Arujo (2017) claims that teachers have negative beliefs that ELLs cannot succeed with high expectations because of their language barriers and low socio-economic living environments. Pettit (2019) administered a survey to determine why other teachers set low expectations for their ELLs and the results to show that teachers do not feel prepared to meet all the challenges that ELLs face in the classroom. Thus, another factor that results in low expectations for ELLs is inadequate teacher preparation programs. Inadequate teacher preparation programs do not only negatively affect teachers but also can cause ELLs to drop out of high school at a faster rate than general education students (Rodriguez et al., 2022). Therefore, all these factors encourage teachers to set low expectations for ELLs because they do not believe they are capable of achieving higher expectations.

The take-away from this capstone project is that there are many instructional approaches and methodologies that can be implemented in any math classroom. Research suggests that implementing Content Language Integrated Learning (CLIL), Universal Design for Learning (UDL), and mathematical linguistic strategies will provide ELLs with the opportunity to meet the high expectations that teachers set. These approaches and methods will help increase ELLs motivation, self-efficacy, and academic achievement outcomes.

Implications for Student Learning

As stated thoroughly in previous chapters, low expectations have a negative impact on ELLs and their academic achievement. Thus, when teachers set high expectations for ELLs and implement effective strategies that provide ELLs the access to learn and understand the material, they are inclined to perform significantly higher in their academics.

First, ELLs mindsets and attitudes toward math and their work ethic will change. In Chapter 2, Walker and Hwa Walker (2021) study discussed the impact of a teacher, Ms. Jazmine Espinoza, when she had a positive mindset and constant belief for the ELLs in her class. The findings of the study resulted in a higher student participation and engagement rate. When students are more engaged and begin to participate more, their self-efficacy and motivation will increase because they believe in themselves.

Second, ELLs will begin to perform higher in their academics when high expectations are set for them. High expectations create a positive learning environment which leads to students developing a positive outlook on their own learning. Sanders et al. (2018) study, discussed in Chapter 2, measured the correlation between the learning climate and math test results. Sanders et al. found that students who had a positive mindset in the classroom environment scored nine points higher than students who had a negative mindset in the classroom environment.

Overall, the research has claimed that high expectations ultimately create a positive learning experience for ELLs in a challenging subject like math. Setting high expectations for ELLs provides them with the motivation to strive for success no matter the barriers they may face.

Implications for Teaching

Setting high expectations will not only benefit ELLs but will also benefit teachers. Even though the focus of this capstone project is on students classified as ELLs, all students in the classroom will have the opportunity to benefit from the teaching implications (CLIL, UDL, mathematical linguistic strategies). Many researchers (Jaekel, 2020; Ouazizi, 2016; Pladevall-Ballester, 2014; Surmont et. al., 2016) completed studies in which their findings stated that CLIL improved ELL learning outcomes. CLIL is a method that is not only implemented for ELLs but can be implemented into bilingual classrooms or mainstream- English classrooms. CLIL can positively affect both ELLs and general education students (Pladevall-Ballester, 2014). Similarly, UDL can also benefit ELLs and general education students simultaneously because encourages teachers to provide multiple ways of teaching information and multiple ways for students to demonstrate their knowledge (Lopes-Murphy, 2012). Implementing these strategies and methods will guide teachers to reach the strengths and weaknesses of each and every student in the classroom.

Teachers will also benefit from the professional development (PD) because they will become more aware of how their initial perceptions may affect their teaching style and classroom community. Through administering and comparing the pre-and post- *Mathematics Teachers' Beliefs About English Language Learners* (MTBELL) survey, teachers will acknowledge their mindsets and ensure they alter their thinking to foster positive social and academic connections

in the classroom. Similarly, Rodriguez (2012) discussed how the neighborhood bus tour changed the initial perceptions of ELLs. After the bus tour, many teachers admitted that their views changed due to becoming more educated on their students' backgrounds and building stronger connections with their students' families. Providing teachers the time to consider their own educational backgrounds, teaching methods, and mindsets may help them develop into better educators and advocates for each of their students.

Recommendations

Throughout this capstone project, the research has suggested many methods teachers can implement into their teaching practices to foster high expectations for ELLs in math. However, more research needs to be completed on determining how teachers know they are setting high expectations and if their students are meeting them. Once educational professionals and departments are able to determine an assessment tool for both teachers and students on the effectiveness of expectations, research will be able to determine more individualized strategies and their effects on setting and meeting high expectations.

Final Thoughts

It is critical for teachers to understand the significant impact expectations can have on ELLs. Understanding how to foster high expectations in a math classroom will help ELLs develop a deeper understanding of the content and demonstrate their ability to succeed. Thus, teachers must be able to identify the methods, strategies, and tools that should be implemented in the classroom in order to help all ELLs succeed in math.

References

- Anhalt, C. O., & Pérez, M. (2013). K–8 Teachers' Concerns about Teaching Latino/a Students. *Journal of Urban Mathematics Education*, 6(22), 42–61.
- Akbarov, A; Gonen, K.; & Aydoğan, H. (2018). Content and (English) language integrated learning (CLIL) applied to math lessons. *Acta Didactica Napocensia*, 11(2), 1-10, DOI: 10.24193/adn.11.2.1.
- Araujo, Z. (2017). Connections Between Secondary Mathematics Teachers' Beliefs and their Selection of Tasks for English Language Learners. *Curriculum Inquiry*, 47(4), 363–389. <https://doi.org/10.1080/03626784.2017.1368351>
- Bengtsson, M. (2012). Mathematics and Multilingualism- Where Immigrant Pupils Succeed. *Acta Didactica Napocensia*, 5(4), 17–24.
- Doran, P. (2015). Language Accessibility in the Classroom: How UDL Can Promote Success for Linguistically Diverse Learners. *Exceptionality Education International*, 25(3), 1–12. <https://doi.org/10.5206/eei.v25i3.7728>
- Gann, L., Bonner, E., & Moseley, C. (2016). Development and Validation of the Mathematics Teachers' Beliefs About English Language Learners Survey (MTBELL). *School Science & Mathematics*, 116(2), 83–94. <https://doi.org/10.1111/ssm.12157>
- Hamann, E. T., & Reeves, J. (2013). Interrupting the Professional Schism That Allows Less Successful Educational Practices With ELLs to Persist. *Theory Into Practice*, 52(2), 81–88. <https://doi.org/10.1080/00405841.2013.770325>
- Harklau, L., & Ford, M. K. (2021). English Learner Education and Teacher Preparation in the U.S.: An Interpretive Language Education Policy Analysis. *Language and Education*, 36(2), 137–151. <https://doi.org/10.1080/09500782.2021.1981925>

- Jaekel, N. (2020). Language Learning Strategy Use in Context: The Effects of Self-efficacy and CLIL on Language Proficiency. *International Review of Applied Linguistics in Language Teaching*, 58(2), 195–220. <https://doi.org/10.1515/iral-2016-0102>
- Kim, S., Chang, M., Singh, K., & Allen, K. R. (2015). Patterns and Factors of High School Dropout Risks of Racial and Linguistic Groups. *Journal of Education for Students Placed at Risk*, 20(4), 336–351. <https://doi.org/10.1080/10824669.2015.1047019>
- King-Sears, M., & Johnson, T. (2020). Universal Design for Learning Chemistry Instruction for Students With and Without Learning Disabilities. *Remedial and Special Education*, 41(4), 207–218. <https://doi.org/10.1177/0741932519862608>
- Leali, S., Byrd, D., & Tungmala, M. (2012). Instructional Strategies and Word Problems of English Language Learners. *Journal of the International Society for Teacher Education*, 16(2), 98–109.
- Lopes-Murphy, S. (2012). Universal Design for Learning: Preparing Secondary Education Teachers in Training to Increase Academic Accessibility of High School English Learners. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 85(6), 226–230. <https://doi.org/10.1080/00098655.2012.693549>
- Orosco, M. J., Swanson, H. L., O'Connor, R., & Lussier, C. (2013). The Effects of Dynamic Strategic Math on English Language Learners' Word Problem Solving. *The Journal of Special Education*, 47(2), 96–107. <https://doi.org/10.1177/0022466911416248>
- Ouazizi, K. (2016). The Effects of CLIL Education on the Subject Matter (Mathematics) and the Target Language (English). *Latin American Journal of Content & Language Integrated Learning*, 9(1), 110–137. <https://doi.org/10.5294/laclil.2016.9.1.5>

- National Council of Teachers of Mathematics. (2016). *High Expectations in Mathematics Education: A Position of the National Council of Teachers of Mathematics*.
<https://www.nctm.org/Standards-and-Positions/Position-Statements/High-Expectations/>
- Peterson, E. R., Rubie-Davies, C., Osborne, D., & Sibley, C. (2016). Teachers' Explicit Expectations and Implicit Prejudiced Attitudes to Educational Achievement: Relations with Student Achievement and the Ethnic Achievement Gap. *Learning and Instruction, 42*, 123–140. <https://doi.org/10.1016/j.learninstruc.2016.01.010>
- Pettit, S. K. (2019). Factors Influencing Middle School Mathematics Teachers' Beliefs about ELLs in Mainstream Classrooms. *Issues in the Undergraduate Mathematics Preparation of School Teachers, 5*, 1–6.
- Pladevall-Ballester, E. (2014). Exploring Primary School CLIL Perceptions in Catalonia: Students', Teachers' and Parents' Opinions and Expectations. *International Journal of Bilingual Education and Bilingualism, 18*(1), 45–59.
<https://doi.org/10.1080/13670050.2013.874972>
- Roberts, N. S., & Truxaw, M. P. (2013). For ELLS: Vocabulary Beyond the Definitions. *The Mathematics Teacher, 107*(1), 28–34. <https://doi.org/10.5951/mathteacher.107.1.0028>
- Rodriguez, D., Carrasquillo, A., Garcia, E., & Howitt, D. (2022). Factors that Challenge English Learners and Increase their Dropout Rates: Recommendations from the Field. *International Journal of Bilingual Education and Bilingualism, 25*(3), 878–894.
<https://doi.org/10.1080/13670050.2020.1722059>
- Rodríguez, M. A. (2012). “But They Just Can’t Do It.” *Journal of Cases in Educational Leadership, 15*(1), 25–31. <https://doi.org/10.1177/1555458912442605>

- Ross, K. E. (2013). Professional Development for Practicing Mathematics Teachers: A Critical Connection to English Language Learner Students in Mainstream USA Classrooms. *Journal of Mathematics Teacher Education*, 17(1), 85–100.
<https://doi.org/10.1007/s10857-013-9250-7>
- Sanders, S. M., Durbin, J. M., Anderson, B. G., Fogarty, L. M., Giraldo-Garcia, R. J., & Voight, A. (2018). Does a Rising School Climate Lift All Boats? Differential Associations of Perceived Climate and Achievement for Students with Disabilities and Limited English Proficiency. *School Psychology International*, 39(6), 646–662.
<https://doi.org/10.1177/0143034318810319>
- Sanford, A., Pinkney, C., Brown, J., Elliot, C., Rotert, E., & Sennott, S. (2019). Culturally and Linguistically Responsive Mathematics Instruction for English Learners in Multitiered Support Systems: PLUSS Enhancements. *School Psychology International*, 43(2), 101–114. <https://doi.org/10.1177/0731948719836173>
- Shindler, J. (2020). "I Have High Expectations!" But What Does That Mean in Practice? Contrasting Empowering Vs. Disempowering Applications of the Same Term. *Journal of Higher Education Theory and Practice*, 20(14), 49–59.
<https://doi.org/10.33423/jhetp.v20i14.3849>
- Soland, J., & Sandilos, L. E. (2021). English Language Learners, Self-efficacy, and the Achievement Gap: Understanding the Relationship between Academic and Social-emotional Growth. *Journal of Education for Students Placed at Risk (JESPAR)*, 26(1), 20–44. <https://doi.org/10.1080/10824669.2020.1787171>

- Suh, H. (2020). Preparing Mathematics Teachers to Teach English Language Learners: What We Know and What We Can Do. *The Educational Forum*, 84(3), 200–209.
<https://doi.org/10.1080/00131725.2020.1728805>
- Surmont, J., Struys, E., Van Den Noort, M., & Van De Craen, P. (2016). The Effects of CLIL on Mathematical Content Learning: A Longitudinal Study. *Studies in Second Language Learning and Teaching*, 6(2), 319–337. <https://doi.org/10.14746/ssllt.2016.6.2.7>
- Walker, D., & Hwa Walker, S. (2021). Empowering Care in the Inner-City: Meeting Standards with High Expectations. *Educational Review*, 73(3), 330–345.
<https://doi.org/10.1080/00131911.2019.1619519>
- Wilson, A. (2016). Knowledge for Equitable Mathematics Teaching: The Case of Latino ELLs in U.S. Schools. *The Mathematics Enthusiast*, 13(1), 111–129.
<https://doi.org/10.54870/1551-3440.1368>
- Yeong, J., Jackson, C., & Martinez, R. (2020). Impact on Teacher Beliefs About Emergent Bilinguals' Mathematical Learning. *Mathematics Teacher Education and Development*, 22(1), 68–90.

Appendix A

Figure 1

Day 1 Agenda

<p><u>Learning Objectives:</u> Participants of the PD will be able to:</p> <ol style="list-style-type: none"> 1) Define high expectations 2) State the causes and reasons as to why low expectations are set for ELLs 3) State the impact low expectations have on ELLs 	
3:30 PM- 3:35 PM	Participants find a seat and follow directions to Google Form and input survey responses
3:35 PM- 3:40 PM	Review agenda Review learning objectives
3:40 PM- 3:45 PM	Read/Annotate- NCTM (2016) article
3:45 PM- 3:50 PM	Brief discussion & Powerpoint presentation- NCTM (2016) article
3:50 PM- 4:05PM	Math Scenario Checklist Activity
4:05 PM- 4:10 PM	Brief discussion- Math Scenario Checklist Activity
4:10 PM - 4:15 PM	Brainstorm- Reasons for Low Expectations/ Impact on ELLs
4:15 PM- 4:25 PM	Powerpoint presentation- Research regarding low expectations and their impact on ELLS
4:25 PM- 4:30 PM	Administer/Explain- Exit ticket

Figure 2

Math Scenario Checklist

Directions: As you watch the video:

- 1) Write examples in the **yes** column when the teacher demonstrates specific criteria
- 2) Write examples in the **no** column when the teacher could have demonstrated specific criteria better

YES	Expectation Criteria	NO
	Teachers must accept that all students have the ability to complete challenging mathematical tasks	
	Teachers must help students develop a confident and supportive self-identity relationship with math	
	Teachers must create curriculum and lesson plans that draw on students' existing knowledge and experiences	
	Teachers must structure lessons where students are responsible for reasoning and sense-making	
	Teachers must consider how activities and instruction might be enhanced to give more access, challenge, and support to all students.	

Figure 3

Reasons for Low Expectations

Directions: Brainstorm with your partner the variety of reasons why low expectations may be set for ELLs.

-
-
-
-
-
-

Figure 5*Day 2 Agenda*

<u>Learning Objectives:</u> Participants of the PD will be able to apply the following to any math lesson:	
<ol style="list-style-type: none"> 1) Content and Integrated Learning (CLIL) 2) Universal Design for Learning (UDL) 3) Word Problem Strategies 4) Vocabulary Strategies 	
3:30 PM- 3:40 PM	Review and Discuss Exit Ticket from Day 1
3:35 PM- 3:40 PM	Review agenda Review learning objectives
3:40 PM- 4:10 PM	Community Bus Ride
4:10 PM- 4:20 PM	Discussion- Community Bus Ride
4:20 PM- 4:35 PM	Powerpoint presentation- Content and Integrated Language Learning
4:35 PM- 4:45 PM	Powerpoint presentation- Universal Design for Learning
4:45 PM- 4:55 PM	UDL Graphic Organizer Activity
4:55 PM - 5:05 PM	Powerpoint presentation- Mathematical teaching strategies
5:05 PM - 5:10PM	Administer/Explain- Exit ticket

Figure 6

CLIL Guided Notes

CLIL Main Pillars:

Pillar 1:

Pillar 2:

Pillar 3:

Pillar 4:

CLIL Advantages:

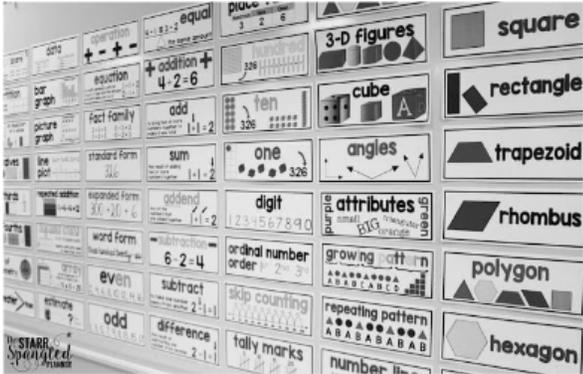
CLIL Disadvantages:

Extra Notes/ Thoughts/ Opinions:

Figure 8
Instructional Strategies and Methods Slide Notecatcher

Word Problems

- ❖ When working with word problems, teachers lower expectations for ELLs
- ❖ When teaching word problems, teachers should:
 - Provide background knowledge
 - Find word problems that connect with the students
 - Pre-teach
 - Concepts
 - Skills
 - Provide academic language supports for assistance with vocabulary
 - Word walls
 - Vocabulary Journals
 - Visuals
 - Audio Recordings
 - Graphic Organizers



Mathematical Linguistic Strategies 25

Figure 9

Classroom Implication Notes

Directions: As you implement the suggestions from the second session, record notes on how the strategies, approaches, and tools benefited you, the classroom, and the ELLs. Likewise, record notes on how the strategies, approaches, and tools challenged you, the classroom, and the ELLs. Be ready to share at the final session!

<u>Positive Results/Benefits</u>	<u>Negative Results/ Challenges</u>

Figure 10*Day 3 Agenda*

<u>Learning Objective:</u> Participants of the PD will be able to reflect on results and findings from the MTBELL survey and classroom implications.	
3:30 PM- 3:35 PM	Participants find a seat and follow directions to Google Form and input survey responses
3:35 PM- 3:40 PM	Review agenda Review learning objectives
3:40 PM- 4:00 PM	Small group discussion of classroom implications and findings
4:00 PM- 4:15 PM	Whole group discussion on commonalities and differences from classroom implications
4:15 PM- 4:25 PM	Survey comparison results and discussion
4:25 PM- 4:30 PM	Exit Ticket

Figure 11*Exit Ticket*

Directions: In your own words (500 words minimum), reflect on the following prompts:

- What is your most important takeaway?
- How does this take away impact your learning and teaching?
- What might you do differently based on what you learned throughout all three sessions of the professional development?
- How did the professional development change your mindset? If your mindset remained the same, what suggestions would you recommend?
- Why is what you learned from this professional development meaningful and relevant?