MIDDLE SCHOOL MATHEMATICS TEACHERS' BELIEFS ABOUT ENGLISH LANGUAGE LEARNERS IN MAINSTREAM CLASSROOMS

by

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(Under the Direction of K. Denise Glynn)

ABSTRACT

The purpose of this study was to explore the beliefs middle school mathematics teachers have about English Language Learners (ELLs) and the factors influencing those beliefs, to identify the strategies teachers use to help ELLs, and to explore the support teachers need to teach ELLs. One hundred six middle school mathematics teachers from 11 school systems in Georgia completed the "Middle School Mathematics Teachers' Beliefs about English Language Learners Questionnaire." From volunteers on the questionnaire, five teachers were interviewed. In addition, through interviews with four ELLs, students' experiences in mathematics classrooms were explored. Results from the questionnaire indicated that 86% of the teachers welcome the inclusion of ELLs in their classrooms, but 88% feel that language is an issue in mathematics classrooms. Teachers who had received training felt significantly more prepared to teach ELLs and to help them understand class materials than did teachers who had not received training. In addition, females believed significantly more than males that teachers should modify assignments for ELLs. Only 24% of the teachers believed they have adequate training to teach ELLs, and 74% of the teachers wanted more training in working with ELLs. The students

interviewed reported having difficulties in mathematics class because of words they could not understand; these ELLs also desired more materials in their native language. Recommendations for middle school mathematics teachers include taking responsibility for the ELLs in their classrooms and increasing their collaboration with the English to Speakers of Other Languages teacher. Teachers need more training in teaching ELLs and additional bilingual resources compatible with the Georgia Performance Standards. Additional research should be conducted with school systems with ELL populations that vary in size and nationalities. In addition, researchers could use longitudinal studies to investigate changes in teachers' beliefs over time.

INDEX WORDS: ESOL, teacher beliefs, English language learner, mathematics, critical theory, middle school

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DEDICATION

For my husband and best friend, Jeff: None of this would have been possible without you. I am so blessed to be sharing my life with such a wonderful and caring man. I love you!

For my little guy, Gavin: You have brought more joy to my life than I ever imagined. I love you so much and cherish every moment we have together. You are growing up too fast!

For my mom: Thank you so much for your invaluable support through trips to Athens, hours of babysitting, and pages of proofreading. Thanks also, Dad, for loaning me your wife so many times! I love you both!

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CHAPTER 1

INTRODUCTION

"When I first came here, I feel nervous and scared because I didn't understand any English."

–Trong, 8th grader from Vietnam

There are over five million ELLs in schools in the United States, and in the last ten years this population has grown 65% (National Clearinghouse for English Language Acquisition [NCELA], 2004). ELLs are estimated to be increasing at two and a half times the rate of the general student population (Marx, 2000; NCELA, 2006). The experiences ELLs will have in school are dependent upon the beliefs of the teachers they encounter. As McSwain (2001) notes, "teachers' self-perceptions of cultural and linguistic competency as they relate to helping children achieve academic and social potential play a powerful and intricate role in the type of educational services provided to culturally and linguistically diverse children" (p. 54). The beliefs and attitudes of teachers, perhaps as much as qualifications, can affect what children learn in their classroom. Teacher beliefs and attitudes, which are formed by the values they hold, play an important role in student performance (Freeman & Freeman, 1994; Moore, 1999). Thompson (1992) emphasizes that "to understand teaching from teachers' perspectives we have to understand the beliefs with which they define their work" (p. 129).

Not only do teachers' beliefs affect the expectations they hold of students, but their actions in the classroom also reflect their beliefs. The study of beliefs is a crucial

element in teacher education because beliefs "drive classroom actions and influence the teacher change process" (Richardson, 1996, p. 102). Therefore, it is necessary to learn about the beliefs of teachers before trying to change their practices. According to Peregoy and Boyle (1997), if teachers have unexamined negative beliefs toward ELLs, even well meaning teachers might discriminate without realizing it. In order for ELLs to become academically successful, teachers must hold positive beliefs and high expectations for them.

Macnab and Payne (2003) point out that "the beliefs and attitudes of teachers–cultural, ideological and personal–are significant determinants of the way they view their role as educators" (p. 55). Teachers' beliefs about the content they teach influence the ways teachers think about their subject matter and the choices they make in their teaching (Richardson**,** 1996). Teachers make choices throughout a lesson, a unit, or a course, each of which is influenced by their beliefs.

Statement of the Problem

All teachers must be prepared for children from non-English speaking home backgrounds. Mainstream teachers are certain to encounter increasing numbers of ELLs in their classrooms. ELLs made up 10.5% of total public school student enrollment in 2005 (NCELA, 2006). Also in 2005, one in five children in public schools had at least one parent born outside the United States (Fix & Capps, 2005). This ratio is even higher, one in three, for grades 6 through 12 (Fix & Capps). English language learners (ELLs) are the fastest growing student population in public schools (Jones, 2002). The

enrollment of ELLs has increased at nearly 7 times the rate of total student enrollment (NCELA). The National Council of Teachers of English (NCTE, 2006) reported that the diversity of these students "continues to challenge teachers and schools" (p. 1). Continued linguistic diversification is projected for the coming decades (U.S. Census Bureau, 2000). ELL enrollment for Georgia in particular increased 291% from 1995 to 2005 (NCELA). Between 1990 and 2000 Georgia had the third most rapid growth in the nation of children of immigrants at 148% (Fix & Capps). With increasing numbers of ELLs in schools, student demographics are changing. Teachers need to be primed for this new challenge.

Many teachers are not adequately prepared to work with a linguistically diverse student population (American Federation of Teachers, 2004; Gandara, Rumberger, Maxwell-Jolly, & Callahan, 2003; Jones, 2002; Menken & Antunez, 2001; National Center for Education Statistics [NCES], 2002b; Nieto, 2003; Wong-Fillmore & Meyer, 1992). Feeling prepared to meet students' needs is crucial for successful teaching; Garcia (1996) found good teachers of ELLs have a sense of self-confidence regarding their ability to teach this population. Without proper training, it is hard to blame teachers for feelings of inadequacy. With the passage of laws, like Proposition 227 in California, more and more ELLs are put in English-only mainstream classrooms led by teachers who have not been trained or "orientated toward responsibility for English language learners" (Jones, p. 7). Only 12.5% of U.S. teachers have received eight or more hours of recent training to teach students of limited English proficiency (NCES). Jones suggests the need to expand "training beyond bilingual and ESL (English as a second language) certification programs and educating all prospective teachers about the needs of second

language learners" (p. 6). Mainstream teachers can expect to teach ELLs, and therefore need to be equipped with the skills to meet their needs.

Significance and Purpose of the Study

The topic of ELLs in mainstream classrooms has grown in importance since the passage of The No Child Left Behind Act (2001). Teachers can no longer expect that because a student is labeled Limited English Proficient (LEP), the term used by the federal government to describe ELLs, his or her test scores will not count in grading the school. Instead, schools will be graded on the percentage of LEP students that do meet the standards according to their proficiency level. The ESOL teacher alone cannot prepare all of these students in every subject area without the help of mainstream teachers, and the beliefs of these mainstream teachers will influence the students' performances. Middle school mathematics teachers in Georgia in particular are affected because according to State Board of Education Rule 160-3-1-.07:

> ELL students enrolling for the first time in a United States school may receive a one-time deferment from content area assessments, other than mathematics and science, if their proficiency in English indicates that testing is not in the best educational interest of the student. *This deferment does not apply to the mathematics and science sections of state mandated tests* regardless of the student's length of time in a US school (Cox, 2007).

There is a mistaken idea that students who do not speak English can still perform well in mathematics, when in fact the Georgia Performance Standards (GPS) place an

emphasis on problem solving and communication (Georgia Department of Education, 2006). The mathematics portion of the CRCT holds high stakes for middle school students. For example, Georgia's policy O.C.G.A. § 20-2-281 reads: "No eighth grade student shall be promoted to the ninth grade if the student does not achieve grade level on the Criterion-Referenced Competency Test in reading and the Criterion-Referenced Competency Test in mathematics." Dillon (2001) argues, "Any system that asks students who do not read or write in English to complete complex state tests is not confronting reality" (p. 99).

The purpose of this study was to explore the beliefs middle school mathematics teachers have about the ELLs in their classrooms and the factors influencing those beliefs. In addition, I wanted to identify the strategies these mathematics teachers use to help the ELLs in their classrooms. I also explored the support teachers need to teach the ELLs in their classrooms. Finally, I hoped to learn how ELLs feel in their mainstream mathematics classrooms.

Research Questions

1. What are the beliefs of middle school mathematics teachers about ELLs in mainstream classrooms?
2. What factors influence these beliefs?
3. What strategies, if any, do teachers use to help ELLs succeed?
4. What types of support are teachers receiving, and what additional support could they use to meet the needs of ELLs?
5. What are the experiences of ELLs in middle school mathematics classrooms?

This is a survey and interview study of middle school mathematics teachers of ELLs and an interview study of ELLs. Teachers completed the "Mathematics Teachers' Beliefs about English Language Learners Questionnaire." The questionnaire was distributed to 439 middle school mathematics teachers in 11 school systems in Georgia. Statistical Package for the Social Sciences (SPSS) was used to analyze the questionnaire results.

Mathematics and English Language Learners

A positive relationship exists between English proficiency and mathematics achievement (Cahnmann & Hornberger, 2000; Remillard & Cahnmann, 2005). "The myth that mathematics is 'culture-free' or a 'shared language' obscures the reality that learning mathematics in a second language requires linguistic, cultural, and content development" (English, 2007). Studies have consistently found that ELLs generally achieve poorly in mathematics (Herman & Abedi, 2004). For example, Abedi and Lord (2001) found that ELLs scored lower on a mathematics assessment than native speakers of English and that ELLs scored higher when linguistic modifications were made. According to Cahnmann and Hornberger, "Numeracy practices are always associated with relations of power, and are intricately connected to the contexts where mathematics is performed and the cultural beliefs and value systems of individuals and social groups" (p. 40). Linguistic barriers must be overcome to teach mathematics for conceptual understanding. Students need language skills, as well as cultural knowledge to perform well in mathematics.

Theoretical Framework

This study was approached from a critical theory perspective because my ultimate goal is to raise critical consciousness and expose the power relations that exist in schools in relation to ELLs. Critical consciousness is an individual's ability to "perceive social, political, economic contradictions, and to take action against the oppressive elements of reality" (Freire, 2005, p. 35). My purpose has not been to merely describe, as in an interpretivist perspective, but to eventually bring about social change. According to Patton (2002), what makes critical theory *critical* is that it "seeks not just to study and understand society but rather to critique and change society" (p. 131). Similarly, Glesne (1999) states, "an explicit purpose of critical theory research is change in attitudes, beliefs, and/or social context for research participants and others" (p. 12).

According to Crotty (1998), "the distinction between qualitative research and quantitative research occurs at the level of methods. It does not occur at the level of epistemology or theoretical perspective" (p. 14). Therefore, it is appropriate to come from a critical theory perspective, most often used in qualitative studies, even though I have predominately used survey research as my methodology.

Dillon (2001) found that teacher discrimination was the number one cause cited by Latino students for their disengagement from school. I have witnessed firsthand the discrimination that can occur towards ELLs as a result of teachers' beliefs. I have heard teachers say that if students do not know English, they will just have to sit there until they learn it. A teacher once told me he believes students need to learn English before they come to the United States (personal communication, April 14, 2007). A principal in a

study by Olsen (1997) said, “This is America and we ought to speak English” (p. 182). As the ESOL population grows, these feelings are likely to become even more negative and pervasive in the education system. As a previous ESOL teacher of recent immigrants, I know the struggles these students face on a daily basis. Their problems do not need to be amplified by prejudiced teachers. Hopefully, through this study about teachers’ beliefs toward ELLs, the consciousness of teachers and others will be raised in an effort to expose to them the injustices occurring in many educational settings. I believe that through reflection, teachers can be led to action and change. I agree with Weiler (1988) that although society can be exploitative and oppressive, it is also capable of change.

Critical Theory

In the critical theory paradigm, researchers believe that a reality exists but it can never be fully apprehended (Guba, 1990). Critical theorists aim to overcome oppression and correct social injustices. “Any situation in which A objectively exploits B or hinders his or her pursuit of self-affirmation as a responsible person is one of oppression” (Freire, 2005, p. 55). I believe an injustice is occurring in many classrooms where teachers are unhappy about teaching ELLs. Because some teachers think ELLs cannot perform at the level of the other students, they do not provide a challenging curriculum for these students, or possibly even ignore the ELLs altogether. This perpetuates inequity among the students in these classrooms. Harklau (1994) found the structure of mainstream instruction allowed few opportunities for extended interaction among ELLs and their teachers, and students seldom received explicit feedback on their language use. Valenzuela (1999) points out that entitlement to a “free” public education does not automatically translate into just schooling conditions, especially for ELLs. Critical theory

is concerned with issues of power and justice and must be connected with an attempt to confront the injustice of a particular society (Kincheloe & McLaren, 2000).

Critical theorists assert that certain groups in any society are privileged over others. This oppression is most forceful when "the subordinates accept their social status as natural, necessary, or inevitable" (Crotty, 1998, p. 158). Unfortunately, students who speak English fluently are often given a higher status in schools than those still learning the language (Dillon, 2001; Harklau, 1994; Olsen, 1997; Tyack, 1974). Harklau (1999) states, "Language-minority students are adversely affected by ability grouping practices in American schools" (p. 51). Dillon found ESL students are tired of being segregated. According to Harklau (1994), ESL class was stigmatized by students as being easy and remedial. Additionally, Olsen (1997) states that "the grim reality is that newcomer students who do not speak English are tracked, separated, provided with inadequate materials and poorly trained teachers, and denied access to core content areas" (p. 244). ELLs deserve to have access to the same curriculum and high standards as native speakers of English. A lack of English proficiency should not be equated with a lack of knowledge.

One basic assumption in critical theory is that language is central to the formation of subjectivity (Crotty, 1998). "Language in the form of discourses serves as a form of regulation and domination" (Kincheloe & McLaren, 2002). Students, especially immigrant students who are not yet adept at the language and culture of where they are living, often accept a subordinate social status in schools (Dillon, 2001; Harklau, 1994; Tyack, 1974)**.** Dillon states, "While ESL students have been granted access to specialized teaching and learning intended to meet their needs, they have been denied access to

knowledge and power from other contexts" (p. 93). Harklau reported, "Perhaps the single most salient aspect of observations of ESL students was their reticence and lack of interaction with native-speaking peers" (pp. 262-263). For example, Yoon (2008) found that even a very interactive student-centered classroom can have hidden power relations that unintentionally position the ELLs in the class as isolated and powerless. Dillon (2001) found that labeling ELLs can be a way those in power control or marginalize the powerless. According to Olsen (1997), "With insufficient English language development and insufficient access to the curriculum in a language they can understand, most immigrant students are (through the forces of schooling) denied equal access to an education" (p. 241). This should not and does not have to be the case.

The concepts of power and privilege are inherent in critical theory (Pearson, 2001). It is possible for one group to unconsciously accept the value system of another privileged, powerful group (Kincheloe & McLaren, 2000). It is natural for students to begin to adopt the language and culture of the United States of America when that is what is rewarded at school (Olsen, 1997; Tyack & Cuban, 1995; Valenzuela, 1999). However, in doing so, they may be sacrificing their native heritage, and consequently losing part of themselves (Tyack, 1974; Valenzuela). For example, Valenzuela states, "Schools are organized formally and informally in ways that fracture students' cultural and ethnic identities" (p. 5). According to Tyack, the more successfully schools Americanized a child, the more the child was weaned away from the standards and traditions of his or her home. Similarly, Olsen found that becoming fluent in English is usually accompanied with a loss of native language use. Furthermore, giving up one's native language in order to learn English and be accepted comes with a high price of losing a strong family

connection and access to one's history (Olsen). Olsen states, "The language in which they can express themselves, the language through which they can understand the world becomes banished" (p. 92). Likewise, Tyack argues, "Schools have sometimes helped to destroy family and community cultures that met human needs and values more fully than did the culture they sought to instill" (p. 249). Schools must find a way to support the preservation of students' native languages while teaching them the English skills they need to be successful.

According to Patton (2002), "Critical theorists set out to use research to critique society, raise consciousness, and change the balance of power in favor of those less powerful" (p. 548). Critical theorists want to transform unequal power relations (Glesne, 1999). The balance of power is typically already unequal between students and teachers, and the problem is worse for ELLs. Cha (2006) found that hidden power relations exist in mainstream classrooms making it difficult for ELLs to learn.

At times, ELLs may reject the narrow view of success that schools offer, especially when it is different from their home culture. They may actively decide that maintaining their own identity and integrity is more important than looking, sounding, and acting like the dominant culture (Fine, 1991). Teachers (those with more power) often have difficulty understanding why their students (with less power) resist what they are given (Fine). For example, teachers may become frustrated when ELLs group themselves together and speak their native language with their friends. Many teachers mistakenly believe ELLs need to speak English at home in order to successfully learn the language. Instead, however, teachers should be celebrating the students' dual heritages and bilingualism. Rather than a strength to build on, students' fluency in another

language is often seen as a barrier that needs to be overcome (Valenzuela, 1999). According to Crane (2004), "It is unfortunate that many teachers use the 'deficit' model of language, focusing on students' lack of English skills but ignoring their strengths in their first language" (p. 152). In reality, proficiency in one language can be an asset to the acquisition of a subsequent language.

In the following sections, I attempt to define and discuss some of the major terms used in critical theory. When reading the literature on critical theory, one is certain to encounter mentions of cultural capital, praxis, hegemony, and conscientisation. In addition, Freire's (2005) *banking* concept of education is one of the major ideas discussed in critical theory.

Cultural Capital

Bennett and LeCompte (1990) define cultural capital as "the knowledge base possessed by individuals. It consists of general cultural knowledge, language patterns, manners, and skills" (p. 32). As one has more cultural capital matching that of the dominant culture, the more power is obtained (Pearson, 2001). Therefore, if ELLs are lacking knowledge about the dominant culture, they will have less power. As students who are new to the country, ELLs will have the least power. In relation to my research, I believe this mismatch of cultural capital between ELLs and their teachers affects students' successes in the classroom. Many ELLs have been asked to sacrifice their home values or cultural norms in order to fit into traditional schools (Tyack, 1974; Valenzuela, 1999). Schools use the language and values associated with the dominant culture (Pearson); therefore, linguistic minority students are at a disadvantage. Schools often do not promote democracy and equality; rather, they reproduce the status quo of inequity

(Weiler, 1988). However, it is incorrect to categorize all immigrants together and to assume they have the same amount of cultural capital. Other factors, including poverty (Tyack) and level of parent education (Ortiz-Franco, 2005), can affect students' success in school.

Praxis

The term praxis is often used in the literature on critical theory and refers in general to action, activity, or turning thought into action (Bottomore, 1983). Bottomore defines praxis as "the free, universal, creative and self-creative activity through which man creates (makes, produces) and changes (shapes) his historical, human, world and himself" (p. 435). Teachers have the power to change the imbalance of power that may exist in their classrooms. According to Freire (2005), "Liberation is a praxis: the action and reflection of men upon their world in order to transform it" (p. 75). Giving the participants in my study the opportunity and time to reflect on their beliefs will hopefully encourage a change in their actions.

Hegemony

"Hegemony represents the ways in which ruling classes affect a society's moral and intellectual leadership so as to have the rulers' interests appear interests of other social groups" (Villanueva, 1991, p. 251). Similarly, Fay (1987) describes hegemony as involving "the ideological domination of one class by another such that the formers' conceptions of what exists, what is appropriate, what possibilities are open to it, and what it should rightfully expect reinforce the position of power of the latter, powerful class" (p. 138). According to Kincheloe and McLaren (2002), hegemony is the effort of the powerful to win consent of their subordinates.

Hegemony can occur through cultural institutions, such as schools (Kincheloe & McLaren, 2002). Teachers are in a position to teach their students, especially those new to the country, what is appropriate and what they can expect from school and society as a whole. If teachers have low expectations for ELLs, these students will begin to believe they cannot achieve (Ortiz-Franco, 2005; Tyack & Cuban, 1995).

Conscientisation

"Conscientisation is an awakening of, or increase in, consciousness" (Crotty, 1998, p. 148). This term is the word most associated with Freire. He describes the process using terms like critical consciousness and critical thinking (Freire, 2005). According to Freire, critical thinking "perceives reality as process and transformation, rather than as a static entity" (p. 64). Similarly, Remillard and Cahnmann (2005) argue that teaching is a dynamic process, rather than a finished product. "A view of teaching as dynamic assumes that change is possible and natural" (Remillard & Cahnmann, p. 184). One of the goals of my research is to increase the critical consciousness of the teacher participants in the study. By sharing my results with them, hopefully they can begin to look critically at the beliefs they hold and possibly begin the process of changing those beliefs. Additionally, I hope the results of my study will show the need for increased professional development in the area of teaching ELLs in mainstream mathematics classrooms. This professional development could ultimately bring about a change in beliefs as well.

Problem-Posing Versus Banking Approach to Education (Freire)

In the *banking* concept of education that is common in our society, education becomes an act of depositing, in which the students are the depositories and the teacher is the depositor (Freire, 2005, p. 72). According to Freire, banking education mirrors

oppressive society as a whole. Problem-posing education exists at the other side of the continuum. This is education as the practice of freedom—as opposed to education as the practice of domination (Freire). "In problem-posing education, people develop their power to perceive critically the way they exist in the world with which and in which they find themselves; they come to see the world not as a static reality, but as a reality in process, in transformation" (Freire, p. 83).

The banking approach to education is detrimental to students in general, but specifically to ELLs. English language learners need to have the freedom to question and critically examine the new world they are experiencing in order to find their place in society. Teachers whose classrooms exemplify banking education are perpetuating the cycle of oppression and domination. On the other hand, problem-posing education solves the teacher-student contradiction and allows both to simultaneously be teachers and students (Freire, 2005).

Critical Theory in this Study

My procedures have undoubtedly reflected my theoretical perspective. My critical theory perspective has guided my research questions, the design of my study, my questionnaire, as well as my data analysis.

In this mixed methods study, I used a questionnaire and interviews to address the research questions from a critical theory perspective. For example, my first general research question about the beliefs of middle school mathematics teachers is broken down into more critical, specific items on the questionnaire. For example, teachers were asked to rate how welcome ELLs are in their classes and whether the teachers believe ELLs hinder other students' learning. Additionally, items addressing whether teachers

believe students should be using their native language have brought to light a form of discrimination that may be occurring. Olsen (1997) states that literacy in one's native language is the best basis for developing literacy in a second language, but the use of a child's home language in school has become a political issue. By forcing students to speak a language that is not the one they would choose, teachers are reinforcing their position of power. Similarly, if teachers have low expectations of ELLs, these students will begin to believe they cannot achieve (Ortiz-Franco, 2005; Tyack & Cuban, 1995). Therefore, the first research question about teachers' beliefs was influenced by my critical theory perspective.

Another research question is about what strategies, if any, teachers are using with ELLs in their middle school mathematics classrooms. If teachers believe ELLs are capable of mastering the required curriculum and teachers believe they are responsible for teaching ELLs, then the teachers might be using strategies to make sure the ELLs have access to the course content. Collaborative learning, discussion, and differentiation are all possible ways teachers could help to meet the needs of ELLs and deconstruct power, rather than reinforcing unequal power relations through direct instruction or lectures.

Critical Theory in the Study Design

Descriptive quantitative approaches are helpful in gaining an initial understanding of a construct including participant perceptions of their behaviors and practices and identification of variables that influence the concept (Fraenkel & Wallen, 2000; Gay & Airasian, 2003). On the other hand, qualitative approaches are best used when a deeper understanding of the issue is desired (Silverman, 2000). Similarly, deMarrais (2004)

states that qualitative interviews provide researchers with "in-depth knowledge from participants about particular phenomena, experiences, or sets of experiences" (p. 52).

In my research, those with the least power are the ELLs themselves. By surveying teachers about their beliefs, I tried to identify any biases that may exist toward ELLs. However, it was important to hear and gain some insight from the students. Therefore, I concluded my study with four student interviews. Using student voices throughout this dissertation has given my study a purpose and provided an appropriate context for the study. More importantly, the act of interviewing and writing up the results alone has given these students some power and may be a step towards freedom, rather than control for the ELLs. According to Dillon (2001), through listening to student voices, transformative opportunities may be created that will encourage dialogue. Asking to be interviewed hopefully showed these students that their opinions and experiences are important and people want to know what they have to say. Both the student and teacher interviews were semi-structured, which allowed the participants to guide the discussion in ways that they chose.

Critical Theory in the Questionnaire

Not only did my research questions point to critical theory, but many questionnaire items did as well. According to Fay (1987), from a critical theory point of view, the use of a questionnaire to encourage respondents to regard their own experiences in a new light is acceptable practice. Through engagement with the questionnaire items, teachers have had an opportunity for a reflective experience that could possibly lead to belief change. I hope through the way I conducted the research, it has created an arena in which participants could see themselves in a new light.

ELLs may not be given the same chances to learn the academic core curriculum as other students. This injustice is due to teachers' low expectations of ELLs and feeling a lack of responsibility in teaching ELLs. Questionnaire items were included to address this issue.

Items were also included to address the issue of respect for students' native language. As discussed in my literature review, the use of a native language at home increases English acquisition and facilitates academic learning, but many students are encourage to speak only English. Kincheloe and McLaren (2002) state that language serves as a form of regulation and domination. By encouraging, or even forcing students to speak only English, teachers are oppressing the ELLs in their classes.

The academic needs of ELLs have the right to be met in mainstream classrooms. Thirteen questionnaire items address the issue of using appropriate strategies that are effective in teaching ELLs. Finally, three items on the questionnaire have helped to gain insight into the power dynamics existing in the classrooms of the teachers surveyed.

Critical Theory in the Data Analysis

The student and teacher interviews were conducted and analyzed using an inductive process. The interviews were audio-taped and transcribed. Using a process described by Coffey and Atkinson (1996), words and word phrases were sorted by similarities, and then codes were applied to them. The codes were placed into categories that resulted in themes. As is explained further in chapter three, the results have been shared with the participants to establish credibility and dependability of this analysis. Having the opportunity to read, comment on, or even critique the final study which participants had such a big part in can be an empowering experience. A critical theory

lens was used to analyze the transcripts obtained from the student and teacher interviews. In both cases, I searched for themes raised by the participants related to critical theory, such as issues of power, domination, or examples of the banking concept of education discussed by Freire (2005).

Summary of Critical Theory in the Study

Through this study, and the inservice teacher education that perhaps will begin as a result of the study, I hope to encourage teachers to take action and create change for equity. Teachers can be instrumental in emancipation for ELLs. According to Kincheloe and McLaren (2000), emancipation is empowering oppressed groups with tools to better understand their situation and seek change if they want it. Even though our current system perpetuates inequity, change can occur through reflection that leads to action.

Clarification of Terms

Making Sense of the Teacher Belief Construct

Kagan (1991) states, "there is no shared understanding of the use of the term *teacher belief*." Sahin, Bullock, and Stables (2002) suggest the idea of belief may refer to "perceptions, assumptions, implicit and explicit theories, judgments, opinions, and more" (p. 373). Some researchers even equate attitudes with beliefs; however, in the last three decades the separation is usually made between attitudes (affective) and beliefs (cognitive) (Richardson, 1996).

While Kagan (1991) uses the terms synonymously, many scholars differentiate knowledge from belief (Calderhead, 1996; Nespor, 1987; Pajares, 1992). For example,

Nespor suggests beliefs have evaluative and affective components that are stronger than knowledge, which connotes a cognitive element. Nespor argues beliefs are more influential and stronger predictors of behavior than knowledge. Richardson (1996) agrees beliefs differ from knowledge, and defines belief as a psychologically held understanding, premise, or proposition about the world that is felt to be true. A critical difference for Richardson is that beliefs, unlike knowledge, "do not require a truth condition" (p. 104).

For the purpose of this study, belief will be defined using Green's (1971) description: a proposition that is accepted as true by the individual holding the belief; a psychological concept that differs from knowledge, which implies epistemic warrant. This classic definition is widely used and encompasses the difference between knowledge and belief assumed in this literature review. According to Pajares (1992), the distinction between belief and knowledge that is common to most definitions is that belief is based on evaluation and judgment, while knowledge is based on objective fact. Kagan (1991) argues "most of a teacher's professional knowledge can be regarded more accurately as belief" because the domain of teaching is characterized by an "almost total absence of truths" (p. 73).

Defining the Mainstream Teacher and the Mainstream Classroom

Before proceeding, it is necessary to clarify one other difficult term in the literature on mainstream teachers' beliefs about English to Speakers of Other Languages (ESOL) students: *mainstream*. Mainstream teachers can be defined as those whose primary training has been in one or more traditional subject areas, such as mathematics, science, English, or social studies. The use of mainstream teacher is synonymous with

regular, content area teacher. Both of these terms (mainstream and regular, content area) are problematic because they imply non-traditional subject area classrooms are irregular, peripheral, or non-mainstream. However, for lack of a better term and because mainstream is most frequently used in the literature (Youngs, 1999), I will use this term throughout the review. Also, when using the term *mainstream* classroom, I am referring to an English-only classroom.

ELLs, ESL and ESOL Students

According to the NCELA (2006), ELLs are students whose first language is not English and who are in the process of learning English. Throughout my literature review and other sections of my dissertation, I will use this term. However, in my questionnaire and teacher interviews, I will refer to ELLs as ESOL (English to Speakers of Other Languages) students because this is how Georgia teachers usually refer to ELLs. The teachers will better understand what I am asking if I use this term. ESOL is defined as an educational approach in which English language learners are instructed in the use of the English language (NCELA). Therefore, although ESOL student is not synonymous with ELL, I will use these terms interchangeably. It is possible to be an ELL without being an ESOL student, but all ESOL students are ELLs. It is this latter group of ESOL students that are ELLs that I am referring to when I use these terms. In addition, the NCELA considers ESL (English as a second language) synonymous with ESOL. Limited English proficient (LEP) is the term used by the federal government to describe students who speak a language other than English in their homes and do not have sufficient mastery of English to meet state standards or be successful in an English-only classroom (Fix &

Capps, 2005). Unless citing a specific statistic or quote, I will not use the term LEP in my writing.

None of the aforementioned acronyms (ELL, ESOL, ESL, and LEP) refer to bilingual students. Bilingual students are fluent in their first language and a second language. I will not be focusing on this group in my study. However, in order to thoroughly review the related literature, some articles mentioned in my review focus on bilingual education.

Summary

Understanding teachers' beliefs about ELLs can aid schools and school systems in planning professional development and the possible purchase of resources. With the recent increases of the ELL population in schools, teachers need to be equipped with the knowledge and strategies to reach these students' needs. Thus, this study will assist decision makers with information on what needs to be done to ensure teachers can effectively teach ELLs in mathematics classrooms.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

"I like barely came to school. We went to school in the class and she told me to go to the board and when I still haven't read the question, so I just had to guess."

–Alicia, 6th grader from Mexico

The purpose of this study was to explore the beliefs middle school mathematics teachers have about the ELLs in their classrooms and the factors influencing those beliefs. In addition, I wanted to identify the strategies these mathematics teachers use to help the ELLs in their classrooms. I also explored the support teachers need to teach the ELLs in their classrooms. Finally, I hoped to learn how ELLs feel in their mainstream mathematics classrooms. The following questions guided the study:

1. What are the beliefs of middle school mathematics teachers about ELLs in mainstream classrooms?
2. What factors influence these beliefs?
3. What strategies, if any, do teachers use to help ELLs succeed?
4. What types of support are teachers receiving, and what additional support could they use to meet the needs of ELLs?
5. What are the experiences of ELLs in middle school mathematics classrooms?

What Research Says about Teachers' Beliefs about Mainstreamed ELLs

This chapter reviews the literature on which this study was built. The following literature review is organized into four sections: (1) inservice teachers' existing beliefs, (2) predictors of inservice teachers' beliefs, (3) changing inservice teachers' beliefs, and (4) inservice teachers' beliefs and practice. According to the research included in this review, a relationship exists between beliefs and practice in relation to teaching ELLs in mainstream classrooms, but the findings are inconsistent. Certain factors are identified as related to mainstream teachers' beliefs about ELLs. Furthermore, I believe the literature shows that although beliefs are highly resistant to change, it is possible to change them through effective professional development or coursework.

The articles in this review were retrieved primarily through Internet search engines, such as ERIC, Google Scholar, and EBSCO. I used key word searches similar to "teacher belief ESOL" and "belief English language learner." I also would search for belief with ESL and English learner, as well as "teacher belief middle school." In addition to Internet search engines, I searched through recent issues of journals publishing on this topic, including *TESOL Quarterly* and *Bilingual Research Journal*. With the exception of classic articles on teacher beliefs in general, I focused this review on the last 20 years, encompassing the years 1987-2007. The year 1987 was significant because in that year Penfield published a seminal article on the perspectives of regular classroom teachers toward ELLs.

So as not to confound the data, in searching for articles, I only included those which discussed the beliefs teachers held about students actually in some type of ESOL

program, not just immigrant students or students whose first language was not English. This is because some students who are immigrants or at one time were learning English as an additional language may now read, write, and speak English with almost native-like fluency. Even if a student was once in the ESOL program, he or she could have exited the program after meeting certain criteria. Undoubtedly, teachers' beliefs about these students would be different than their beliefs about those still needing ESOL services. In addition, my focus here is mainstream teachers' beliefs, not ESOL teachers' beliefs. It is worth noting the paucity of literature discussing inclusion with ELLs. I would have included any articles on this topic in which a mainstream teacher and ESOL teacher were in collaboration in a classroom, but few were found. Therefore, these articles focus almost exclusively on mainstream teachers who are alone in the classroom with ELLs. I include all levels of teachers from upper elementary to high school and in every subject area. The upper elementary (3^{rd}-5^{th}) grades are a significant starting point because according to the Georgia Promotion, Placement, and Retention law (O.C.G.A. §§ 20-2-282 through 20-2-285) and State Board of Education Rule (160-4-2-.11), the policies on standardized testing often begin to affect grade promotion or retention. This could have an effect on the beliefs of teachers and the students they have in their classrooms.

What Research Says about Inservice Teachers' Existing Beliefs about Mainstreamed ELLs

Reeves (2006) conducted a thorough study of teachers' beliefs about ELLs in mainstream classrooms. She surveyed 279 subject-area high school teachers and discovered four important findings: (1) teachers' general attitudes toward ELLs differ from their attitudes toward specific aspects of ELL inclusion, (2) teachers are concerned

about the fairness of modifying coursework for ELLs, (3) teachers are ambivalent toward professional development on working with ELLs, and (4) teachers hold misconceptions about how second languages are learned. Reeves found the teachers in her study held misconceptions that ELLs should be able to acquire English within two years and should not use their native language as they are learning English. In reality, research has shown it can take 5 to 7 years for students to learn the academic language of English (Cummins, 1981), and proficiency in a native language can facilitate the acquisition of a second language (Cummins, 2000; Freeman, Freeman, & Mercuri, 2005; Garcia-Vazquez, Vazquez, Lopez, & Ward, 1997; Lee, 2002). In addition, Garrison (2005) suggests that ELLs should be allowed to write in their native language in mathematics class when appropriate.

Similarly, Karabenick and Noda (2005) surveyed 729 teachers about their beliefs toward ELLs. They found that teachers had gaps in their knowledge of second language acquisition. For example, more than half believed the use of a first language at home interferes with learning a second language, and 23% were unsure how they felt about this statement. This suggests professional development is needed to rectify these misconceptions. Fortunately, the teachers of all levels in the district in Karabenick and Noda's study were open to and thought they needed professional development and had a relatively positive interest in serving ELLs in their mainstream classrooms. A study utilizing interviews and observations by Reeves (2004) yielded similar results. More than half the teachers were interested in receiving more training in working with ELLs, but many also held the belief that native language use in school and at home would slow English acquisition. Similarly, Clair (1995) conducted case studies of three mainstream

classroom teachers to gain an understanding of their professional development needs concerning ELLs. Clair found the teachers lacked an understanding of second language acquisition. Furthermore, Shin and Krashen (1996) administered a questionnaire to 794 elementary and secondary teachers focusing on attitudes toward bilingual education. As a group, participants showed agreement with the underlying principles of bilingual education; however, "support for actual participation in bilingual education was less positive" (p. 52). For example, if children were already bilingual, 40% of respondents were opposed to continuing first language development for these students. Although many teachers advise parents to speak only English at home because they believe bilingualism produces delays and confusion when learning English (McLaughlin, 1992; Wong-Fillmore, 1991), in actuality, proficiency in a native language facilitates English acquisition and leads to higher academic achievement (Cummins, 1992; Garcia-Vazquez et al., 1997; Lee, 2002). Conversely, the loss of proficiency in the native language breaks down communication with family members and lowers self esteem (Lee & Oxelson, 2006; Tannenbaum & Howie, 2002).

In a classic study conducted by Penfield (1987), 162 New Jersey mainstream classroom teachers were surveyed about their perceptions of ELLs and ESL teachers. The fifteen item questionnaire was mostly open-ended and was analyzed using content analysis from the qualitative research paradigm. When asked how they could deal more effectively with ELLs, the most frequent response was the need for more training on how to teach content to them. Many teachers attributed the academic difficulties of ELLs to "laziness or lack of effort" (Penfield, p. 31). Answers to the questionnaire revealed how little mainstream teachers knew about the job of the ESL teacher. The teacher participants

repeatedly expressed the belief that ESL teachers spoke the native language of each student and actually taught in that language (Penfield). The teachers also expressed the feeling that it was the sole job of the ESL teacher to teach ELLs English; however, this is both impractical and incorrect. As Cummins (1997) states, "When the task of educating ELL pupils is left to specialist ESL teachers and no modifications are made in mainstream educational structures to accommodate diversity, the interactions that pupils experience in mainstream classrooms are unlikely to promote either academic growth or affirmation of pupil identity" (p. 111). Mainstream classroom teachers need to accept ELLs as students in their classroom, and therefore their responsibility in order for these students to be successful.

Gandara, Maxwell-Jolly, and Driscoll (2005) administered a questionnaire to 5,300 educators of ELLs in California to find out about the challenges, experiences, and professional development needs of these teachers. They found that for the most part, teachers did not blame the students or their families for low achievement, but instead focused on what they could do to improve student learning. The two greatest challenges confronting the teachers were communication with students and their families and having enough time to teach all of the required subject matter in addition to developing the students' English. The teachers were frustrated with the range of abilities in their classrooms with respect to academics as well as English proficiency, and were also challenged by the lack of resources for teaching and assessing these students. Over the last 5 years, many of the teachers surveyed had received little or no professional development in teaching ELLs. When choices were presented of additional assistance

these teachers desired, they most often chose more time to teach and collaborate with peers and better materials.

Sharkey and Layzer (2000) conducted interviews and classroom observations to investigate the beliefs of mainstream teachers toward ELLs. She found the "benevolent conspiracy" of well-meaning teachers often produces low expectations for ELLs (p. 3). The teachers revealed their theories through the things they said, such as, students are able to pass if they "just hang in there and do their work" (Sharkey & Layzer, p. 4). One teacher in the study revealed it is possible to take a proactive stance towards this kind of disservice to students by making sure ELLs knew the material through "seating assignments, seatwork pairing, and explicit instruction" (Sharkey & Layzer, p. 5). According to Ortiz-Franco (2005), many teachers' low expectations of ELLs can produce obstacles to these students' mathematics achievement. Similarly, Harklau (1999) found that teachers did not call on ELLs for fear of embarrassing them. Katz (1999) states, "Caring about students does not mean being easy on them nor giving them artificially inflated grades" (p. 812). ELLs need to be provided with the support they need in order for them to have equal access to the curriculum.

The type of scaffolding teachers give could be a result of training. In a study conducted by Rueda and Garcia (1994), the beliefs and practices of three different groups of teachers (special education, bilingual credentialed, and bilingual waivered) were found to be conflicting with "those theories underlying many of the new educational initiatives in assessment and instruction" (p. 17). Interviews, questionnaires, and classroom observations were used to gather data. Differences in practice were found among the three groups. The bilingual credentialed teachers used more of a student-centered

approach, while the other two groups used a traditional, skill driven approach. Rueda and Garcia recommend providing opportunities and resources for teacher reflection in order for change to occur for the special education and bilingual waivered groups.

Clair (1993) uncovered numerous misconceptions and frustrations of three mainstream classroom teachers. One problem was the mainstream teachers did not know what went on in the ESL classroom. Greater teacher collaboration was needed. A commonly held belief was that a lack of English in the home negatively affected English language development. In reality, proficiency in a first language facilitates learning a second language (Faltis & Hudelson, 1994). The participants admitted their beliefs about students were partially due to stereotypes they held. The teachers felt inadequate in their ability to teach ELLs. These findings were similar to those of Nixon's (1991) study, which found teachers do not believe ELLs have enough language skills to be in the mainstream classroom. The participants in Nixon's study believed there should be transitional classes before students are put in mainstream classes. Similarly, Youngs (1999) used a questionnaire and interviews to investigate teachers' perceptions of ELLs and found they needed more training in ESL pedagogy. Additionally, teachers noted time as a constraint in meeting the needs of their ELLs. The teachers wanted more collaboration with the ESL teacher, mentors of ELLs, and clarifications on what they should expect from these students.

Harklau (2000) conducted three year-long case studies of immigrant students in the transition from high school to community college. Harklau used interviews, observations, and school documents to analyze the data inductively. Immigrant students at the high school "seemed to be viewed primarily as affiliated with and the responsibility

of the ESOL program and teacher" (Harklau, p. 45). The attitudes toward these students were inconsistent and even when they appeared positive at the surface held the potential to stereotype the immigrant students. The beliefs of the high school teachers in this study "cast students' bilingualism only as a deficit in English" (Harklau, p. 51).

Through these studies, it appears that many teachers are not taking responsibility for the ELLs in their classrooms. In addition, most are not educated on some basic principles of second language learning. These inservice teachers are not familiar with what goes on in an ESL classroom or the role of the ESL teacher. Many feel unprepared to teach ELLs and would like more professional development.

What Research Says About the Predictors of Teachers' Beliefs about ELLs in Mainstream Classrooms

Several studies focus on the factors influencing teachers' beliefs about ELLs in their mainstream classrooms. Byrnes, Kiger, and Manning (1997), in a study of several factors hypothesized to affect teachers' beliefs, found that 191 mainstream teachers who had greater exposure to language diversity had more positive attitudes about diversity. Similarly, Gandara et al. (2005) observed that teachers who had more ELLs in their classrooms felt more competent to teach these students. Crane (2004) found teachers to believe that when the influx of immigrants was a new phenomenon, there were more problems. Additionally, Byrnes, et al. found the region of the country a teacher is living or working in could have an impact on their beliefs about linguistically diverse students. Gandara et al. found through a questionnaire that the more years teachers worked with ELLs, the more highly they rated their ability to teach these students. However, the questionnaire results of Garcia-Nevarez, Stafford, and Arias (2005) showed "the more

years a teacher taught, the more his or her attitude became negative toward his or her students' native language" (p. 295). Similarly, Mantero and McVicker (2006) found that teachers with between six and ten years of teaching experience had the most positive perceptions of ELLs.

Building on the explanatory work of Byrnes et al. (1997), Youngs and Youngs (2001) surveyed 143 middle school mainstream teachers to explore the predictors of their attitudes toward ELLs. Teachers who had taken foreign language courses, had some type of ESL training, or had taken a course in multicultural education were significantly more positive about teaching ELLs than those teachers who had not had these experiences. Additionally, mainstream teachers who had lived outside the United States were significantly more positive about teaching ELLs. Although age did not make a significant difference, females had more positive attitudes toward ELLs than males.

Similar to Youngs and Youngs (2001), Shin and Krashen (1996) found teachers with more training in ESL were more supportive of bilingual education. Gandara et al. (2005) also found "greater preparation for teaching English learners equaled greater teacher confidence in their skills for working with these students successfully" (p. 12). Similarly, Garcia-Nevarez et al. (2005) found evidence in a questionnaire given to 152 Arizona elementary teachers that those certified in bilingual education were more supportive of their students using their native language in the classroom than mainstream teachers. To provide further support to this factor, Mantero and McVicker (2006) reported the more staff development hours taken and "the more graduate credit hours taken in courses dealing with language minority students, the more positive the perception of ELL students" (p. 11). Lee and Oxelson (2006) provide further support that

teachers with more training in teaching ELLs and those fluent in another language other than English will have more positive attitudes toward ELLs and hold beliefs more in line with current research concerning these learners. Lee and Oxelson surveyed 69 teachers and then interviewed ten of them about their attitudes toward students' maintenance of their first language. The teachers with ESOL training "agreed with the idea that the maintenance and proficiency in the heritage language positively affect linguistic minority students' academic endeavors" which corresponds with the research (Lee & Oxelson, p. 461). On the other hand, the teachers without ESOL training believed their foremost priority is to teach English. For these teachers, language learning was an either/or choice; bilingualism was not considered. The second factor found to influence teachers' beliefs was whether they spoke a language other than English. If teachers were fluent in another language, they were "significantly more likely to implement practices that encouraged and affirmed students' home language and cultures in the classrooms" (Lee & Oxelson, p. 464). Similarly, Shin and Krashen found if teachers had more ELLs in their classrooms and were fluent in another language, they tended to demonstrate a stronger support for bilingual education.

What Research Says about Changing Inservice Teachers' Beliefs through Professional Development

Beliefs can be highly resistant to change (Pajares, 1992). Kagan (1991) found a variety of empirical studies testifying that teachers tend to leave preservice education programs with the same beliefs they brought to them. According to Pajares, "the earlier a belief is incorporated into the belief structure, the more difficult it is to alter" (p. 317). Beliefs about teaching are developed during what Lortie (1975) called the apprenticeship

of observation which occurs during the many years spent as students in school. Similarly, and more specific to the topic of this review, Horwitz (1985) suggested teachers' beliefs about language learning come from their second language experiences in secondary school.

Similarly, Pajares (1992) states that with time and use, beliefs "become robust, and individuals hold on to beliefs based on incorrect or incomplete knowledge even after scientifically correct explanations are presented to them," however, this is not to say beliefs cannot change (p. 317). Beliefs may be replaced when they are proved unsatisfactory, but they are "unlikely to prove unsatisfactory unless they are challenged and one is unable to assimilate them into existing conceptions" (Pajares, p. 321). Brown (2004) states beliefs can change as a result of experience. Accordingly, Kagan (1991) argues a program can promote growth among teachers, but "it must require them to make their preexisting personal beliefs explicit; it must challenge the adequacy of those beliefs; and it must give novices extended opportunities to examine, elaborate, and integrate new information into their existing belief systems" (p. 77).

Guskey (1986) found professional development programs can bring about belief change for inservice teachers. For this to be possible, teachers first must be convinced to use a procedure and then find it to be successful in improving student achievement. In Guskey's view, change in belief follows a change in behavior.

Clair and Temple (1999) discussed ways professional development with respect to ELLs should occur. They described exemplary models, but did not conduct empirical research to support their claims. According to Clair and Temple, professional development of teachers needs to be designed with teacher input using principles of adult

learning. Possible structures include university-school partnerships, teacher networks, and teacher study groups. According to Clair and Temple, it is important for inservice teachers of ELLs to understand "basic constructs of bilingualism and second language development, the nature of language proficiency, and the role of the first language and culture in learning" (p. 3). These authors explain that in order for professional development to be successful, it needs to be supported by district and school policies and given adequate time and resources. One model school was described as using peer coaching, peer evaluation and teacher portfolio presentations among the teachers as a part of staff development. Another school reported using peer visitation and small group discussions of professional literature as an effective tool for professional learning.

What Research Says about Inservice Teachers' Beliefs about Mainstreamed ELLs in Relation to Practice

As mentioned previously, the beliefs teachers hold do influence their actions in a classroom (Pajares, 1992). The choices teachers make in the classroom have profound effects on their students. According to Harklau (2000), the actions of teachers of ELLs "not only serve to teach language but also serve to shape students' attitudes toward schooling and their very sense of self" (p. 64).

Kennedy and Kennedy (1996) highlighted some important implications pertaining to the interconnectedness of teachers' beliefs and their behavior. In their summary of this relationship, they concluded that it was possible to change teachers' beliefs by raising awareness; however, they suggested that focusing solely on awareness was not sufficient. According to Kennedy and Kennedy, the context also needs to be taken into account,

particularly through classroom observations. In addition, for belief change by teachers to succeed in practice, it will take top-down support from administration.

At times the tension between espoused beliefs and actual practice affects schools on a district, as well as a school-wide, level. Gitlin, Buendia, Crosland, and Doumbia (2003) investigated a middle school and how immigrants were "caught in institutional practices that simultaneously welcomed and unwelcomed them" (p. 91). Although on the surface, the schools professed to include the new students in the culture of the school, in actuality, the students were participating on the margins. For example, they sat on the fringe tables in the lunchroom and were not highlighted in the school assemblies. Similarly, on a larger scale, in an attempt to meet the needs of a new student population, one Georgia school district formed a Latino educational policy which included a bilingual education and a binational K-12/University partnership (Hamann, 2002). However, the "interface between culture, policy and power" forced only portions of the policy to be put into place (p. 67). In particular, the bilingual education component was not realized in the way it was originally intended.

Rueda and Garcia (1996) used interviews, a questionnaire, classroom observations, and artifacts to explore the differences in belief and relationships to practice among three groups of teachers. The 54 teachers were either teachers trained in bilingual education, "waivered" teachers who were not trained in bilingual education, or special education teachers of "learning handicapped" language minority students (p. 316). Overall, the observations were consistent with the interview and questionnaire data; however, many of the beliefs and practices documented were "at odds with current views of literacy instruction and assessment" (Rueda & Garcia, p. 328). Additionally, the views

of all groups toward bilingualism/biliteracy tended to be less than positive. Prior training did have an effect on teachers' beliefs and practices. As expected, the trained bilingual teachers had more positive views toward their students than the "waivered" or special education teachers.

Through classroom observations of three middle school English language arts teachers over one semester, Yoon (2008) found the way teachers positioned themselves affected their views of their roles as teachers of ELLs. ELLs' levels of participation varied based on whether teachers viewed themselves as a teacher for all students, a teacher for regular education students, or a teacher for a single subject. Yoon's study demonstrates a clear link between belief and practice and reminds us that "what ELLs need is not only effective teaching methods, but also teachers who care and are sensitive to their cultural differences and needs" (p. 517).

Implications for Inservice Professional Development

With respect to inservice teachers, Johnson and Johnson (1996) used a correlational analysis and found multiethnic beliefs were related to thinking styles. They recommend professional development that encourages new information and ideas because abstract thinkers were shown to be more tolerant of ELLs. These changes may be introduced through administration. Principals can influence the beliefs of a faculty, help promote diversity, encourage teacher creativity, and be catalysts for change (Moore, 1999). In addition, Ryan (1995) believes the idea that culture is inseparable from language needs to be taught and put into practice. Ryan emphasizes it is necessary to

"encourage teachers to become sensitive to and skilled in the teaching of culture" (p. 19). Upon concluding ELLs' needs were not being adequately met in mainstream classrooms, Harklau (1994) recommended inservice professional development with a focus on "how input can be adjusted for nonnative speakers and "how appropriate, explicit, and consistent language instruction for ESL students might be incorporated into mainstream instruction" (p. 268). Moore believes collaboration must be practiced and discussed for mainstream teachers to be aware of the ESOL teacher's responsibilities versus their responsibilities in the classroom. Similarly, Gilette (1996) points out that collaboration must take place between teacher educators, school districts, community agencies, and institutions to connect the work of the university to practice. Godley, Sweetland, Wheeler, Minnici, and Carpenter (2006) cautioned that teachers will disregard information that doesn't seem to apply to them. Therefore, "only relevant information anchored in practice is likely to affect teacher practice significantly" (p. 33). Overall, according to Young (1996), "teachers must have opportunities to gain specialized skills to work effectively with ESL students; otherwise, mainstreaming is not a positive solution" (p. 18).

Implications for Research Methodology

In addition to quantitative research, various methods of analysis in qualitative research could strengthen this body of literature. Phenomenological studies could help to explain what it's like to be a mainstream teacher of an ESOL student. Discourse analysis could be used to look closely at the language mainstream teachers are using in

conversation with their ELLs. Stories could be constructed to help readers gain insight into the day-to-day experiences of mainstream teachers of ELLs through narrative analysis.

With respect to the majority of the experimental studies, the authors did not admit the danger of novelty effects. Perhaps teachers in these studies appeared to change their beliefs because what was presented to them was new and exciting, but the changes may not have been long lasting. Additionally, many of the experimental studies would be difficult to replicate because of inadequate information about the participants. The authors should provide a description of the number, ethnicity, social class, age, and gender of those participating in the study in order to make appropriate conclusions.

The studies reviewed here indicated teachers do alter their beliefs. Nevertheless, as Middleton (1999) points out, "long term studies are needed to clarify just how these alterations occur" (p. 357). The need for longitudinal studies was a common theme among many of the articles. For example, Richardson (1996) notes, "an understanding of the relationship between beliefs and learning to teach, however, would be enhanced by longitudinal studies of teachers who move from preservice teacher education into teaching practice" (p. 110). Camacho, Socas, and Hernandez (1998) also included a recommendation about the necessity of continuing analysis through longitudinal studies about the conceptions, attitudes, and beliefs of future teachers from their first year at university until they graduate.

The research on predictors of mainstream teachers' beliefs about ELLs uses survey research almost exclusively. Questionnaires provide useful knowledge as a starting point to understanding beliefs, but are not adequate alone. Teachers may not be

able to articulate certain beliefs or realize they even hold them. Perhaps longitudinal, observational studies could add to the knowledge in this area.

Thompson's (1992) reflections summarize future recommendations for research methods with respect to teachers' beliefs about ELLs. She writes that as individuals, teachers may not be the best to clearly explain their own beliefs and perspectives. Teachers may not realize they hold, or may be unable to articulate certain beliefs. Therefore, Thompson concludes "investigations of teachers' beliefs should examine teachers' verbal data along with observational data of their instructional practice; it will not suffice to rely solely on verbal data" (p. 135). Another possibility is to use photo elicitation interviews to stimulate discussions by teachers or even use photo voice to allow the teachers to take pictures of what they see and feel which they may not be able to put into words. Perhaps some mixed methods research could be used to identify a widespread phenomenon, as well as understand it on a deep level.

Implications for Future Research

Future research is needed in the area of teachers' beliefs about English language learners, particularly in the areas of changing teachers' beliefs and the association between beliefs and practice. Additionally, the current shift is for ESOL teachers and mainstream teachers to collaborate in inclusion classrooms, yet very little research in this area was found. The effect mainstreaming has on the role of ESOL teachers in schools should be considered. As Platt, Harper, and Mendoza (2003) found in their study in Florida, when ESOL teachers are "eliminated or forced to become jacks-of-all trades in a

school their curricular and methodological expertise is either lost or diluted for distribution to the general faculty, who often lack fundamental knowledge of language and the L2 learning process and of how to implement this understanding" (p. 128). ESOL teachers have valuable expertise to offer to schools, but for this knowledge to be utilized to its potential, the mainstream teachers they work with must have some training in ESOL pedagogy as well. Perhaps the idea of a separate ESOL teacher should be reconsidered. As opposed to collaborative classes with ESOL and mainstream teachers, another possibility is for all teachers to become credentialed to teach ELLs.

The findings of this review suggest there is a need for further research related to the predictors of mainstream teachers' beliefs toward working with ELLs. Youngs and Youngs (2001) reported that 71% of the variance in teachers' beliefs was unexplained. Future research is needed to pursue additional predictors of teachers' beliefs about ELLs in their classrooms. Youngs and Youngs found that a more diverse ESOL population yielded more positive attitudes of teachers toward the ELLs in their classrooms. Research should be done to investigate whether ELLs' geographical origins impact teachers' beliefs. This could help explain why Byrnes et al. (1997) found living in certain regions of the country affected teachers' beliefs. The size of the ESOL population was also not considered as a factor in the majority of these studies. Research should also be conducted in settings with various numbers of ELLs, including those districts with small numbers to see if this affects teachers' beliefs.

Conclusion

Studying the beliefs teachers hold toward ELLs in their classrooms is important in order to raise awareness of the need for more formal training for inservice teachers. Although beliefs are highly resistant to change, it is possible to change them through effective professional development. As the numbers of ELLs entering school systems throughout the United States grows, it will become increasingly vital for the academic, as well as affective, needs of these students to be met. According to the research included in this review, there is a consistency between beliefs and practice in relation to teaching ELLs in mainstream classrooms. If teachers' beliefs can be understood and the predictors of certain beliefs toward ELLs identified, the education of the fastest growing population today can begin to improve.

CHAPTER 3

METHOD

"When I was new, I was, like, nervous, not talking to people because you don't know no one and sad because the teacher asks something and you don't know but some people tell you but you still don't know if they tell you exactly what she says."

--Alicia, 6th grader from Mexico

The purpose of this study was to explore the beliefs middle school mathematics teachers have about the ELLs in their classrooms and the factors influencing those beliefs. In addition, I wanted to identify the strategies these mathematics teachers use to help the ELLs in their classrooms. I also explored the support teachers need to teach the ELLs in their classrooms. Finally, I hoped to learn how ELLs feel in their mainstream mathematics classrooms.

Research Questions

1. What are the beliefs of middle school mathematics teachers about ELLs in mainstream classrooms?
2. What factors influence these beliefs?
3. What strategies, if any, do teachers use to help ELLs succeed?
4. What types of support are teachers receiving, and what additional support could they use to meet the needs of ELLs?

5. What are the experiences of ELLs in middle school mathematics classrooms?

This chapter describes the study data sources, research design, procedures, and analyses.

Data Sources

Both qualitative and quantitative data were gathered for the study. Specifically, data came from four sources: a web-based teacher questionnaire, a teacher focus group, student interviews, and teacher interviews.

Mathematics Teachers' Beliefs about English Language Learners Questionnaire

I designed the web-based "Mathematics Teachers' Beliefs about English Language Learners Questionnaire" to explore the beliefs middle school mathematics teachers have about the ELLs in their classrooms and the factors influencing those beliefs. In addition, the questionnaire is designed to identify the strategies mathematics teachers use to help the ELLs in their classrooms as well as the support teachers need.

Survey versus questionnaire. When authors write about survey research, they may be referring to either a method or an instrument of data collection. As a method of data collection, survey research is used to describe a larger process that could include observations, interviews, and questionnaires. Looking at survey research from the point of view as a method of data collection, questionnaires refer to instruments of data collection. Many researchers, however, use the term "survey" to refer to the actual instrument of data collection, analogous to a questionnaire. For example, according to Bogdan and Biklen (1998), surveys, interviews, and observations are the specific

techniques researchers use—"the more technical aspects of the research" (p. 31). In this study, I used the term survey research to describe the broader method of data collection, and I referred to the instrument as a questionnaire.

Advantages of questionnaires. As Scheuren (2004) points out, "Questionnaires provide a speedy and economical means of determining facts about people's knowledge, attitudes, beliefs, expectations, and behaviors" (p. 10). In this study, I hoped to learn about middle school mathematics teachers' beliefs about ELLs in their classrooms. By administering a web-based questionnaire, I was able to reach a large number of teachers across Georgia in a reasonable amount of time. According to Heflich and Rice (1999), web-based questionnaires allow for quick data collection from a variety of populations. Similarly, according to Zhang (1999), web-based questionnaires usually have a shorter turnaround time and reach potential respondents in geographically remote areas. I used my own funds to finance the research, and with web-based questionnaires, the costs for sending questionnaires and coding data are low (e.g., Archer, 2003; Gosling, Vazire, Srivastava, & John, 2004).

A web-based questionnaire is the collection of data through a self-administered electronic set of items on the web (Archer, 2003). I sent out the web-based questionnaire as an HTML link through email. One advantage of using the web is that emails generate almost instantaneous feedback (Fowler, 2002; Heflich & Rice, 1999; Lee, Frank, Cole, & Mikhael, 2002; Schillewaert, Langerak, & Duhamel, 1998; Solomon, 2001). According to Heflich and Rice, web-based questionnaires address the need for a less expensive and more expedient method of data collection. Reminders and follow-ups on non-respondents are also relatively easy when using email (Archer; Dillman, 2000). Research (e.g.,

Archer; Dillman; Solomon) also shows that the time of conducting a survey can be reduced using email because with one click, questionnaires can be sent to numerous participants rather than stuffing and mailing envelopes.

Another advantage of web-based questionnaires is that data can easily be imported into a data analysis program (Archer, 2003; Dillman, 2000); I used SurveyMonkey to gather my data, which was then imported into SPSS. Similarly, Solomon (1999) believes web-based questionnaires help researchers avoid the often error-prone and tedious task of data entry. Additionally, web-based questionnaires may increase motivation by providing an interactive survey process. For example, researchers have the ability to use advanced design features such as color and innovative item displays (Gosling et al., 2004; Lee et al., 2002). I chose a green background for my questionnaire and created the pages so that only a few items had to be viewed at once.

Research has shown that web-based samples are just as diverse with respect to gender, socioeconomic status, geographic region, and age as mail questionnaires (Gosling et al., 2004). The quality of data of web-based questionnaires is also comparable to mail questionnaires (Fowler, 2002; Gosling et al.). In addition, Gosling et al. found that web-based findings are consistent with findings based on traditional methods.

Questionnaire design. In designing the questionnaire, I began by identifying topics related to ELLs in mainstream classrooms. I also examined other questionnaires (i.e., Karabenick & Noda, 2005; Reeves, 2006) used in research with ELLs. Next, I started the process of narrowing down topics and drafting questionnaire items. Archer (2003) advises researchers to simplify web-based questionnaires even more so than paper questionnaires. As suggested by Bradburn, Sudman, and Wansink (2004), in order to

justify the inclusion of each questionnaire item, I began by creating a conceptual framework (see Appendix A) where each question relates back to specific variables in my study.

The final step in designing the questionnaire was to change the paper version into an electronic version. I used the program SurveyMonkey to convert the questionnaire into its final web-based form (see Appendix B). SurveyMonkey is an online survey tool that enables researchers to create their own surveys using premade templates and item response formats.

Questionnaire topics and items. The questionnaire is composed of 56 items: 24 items focus on teacher beliefs, 11 items focus on factors influencing teacher beliefs, 13 items focus on teacher strategies, and 7 items focus on teacher support. In addition, one question asks teachers to identify their school system. In order to increase the internal reliability of the questionnaire, six of the items are negatively worded.

Fourteen (see Appendix C) of the 56 items were borrowed from other researchers and modified; 10 items came from Reeves (2006) and 4 items came from Karabenick and Noda (2005). I changed some wording in the items to fit the vocabulary I used, such as ESOL student. Reeves provided her questionnaire in the appendix of her 2006 article. I emailed Karabenick for his questionnaire after reading his article. He said the items were under revision, so it would be inappropriate to give me the actual questionnaire. Instead, he gave me a list of items he was working on and said to cite them as being based on the 2005 article.

Of the 24 items under the topic of teacher beliefs**,** 12 items focus on beliefs about the impact of having ELLs in mainstream mathematics classrooms, and 4 items focus on

beliefs about how languages are learned. Because teachers' self efficacies have been shown to affect student success (Garcia, 1996; McSwain, 2001), six questions focus on teachers' beliefs about how they are doing in meeting the needs of the ELLs in their classrooms. Because this questionnaire is for mathematics teachers, two questions focus specifically on teachers' beliefs about mathematics in relation to ELLs.

Eleven questionnaire items concentrate on factors influencing teacher beliefs. These items ask about teaching experience, living in another country, training received in teaching ELLs, gender, languages spoken, travel experience, and the number of ELLs taught. As previously discussed, research has shown that each of these variables is related to teachers' beliefs.

The 13 items under the topic of teacher strategies focus on teacher collaboration and classroom practices. For example, I included items related to assessment strategies because continual assessment is important for the success of ELLs.

The final topic of teacher support includes seven items addressing professional development and teacher resources. Professional development has been shown to affect teachers' beliefs (Clair & Temple, 1999; Guskey, 1986). I asked about the support teachers need and what they would like to learn more about in the area of teaching ELLs.

Questionnaire response formats. The questionnaire is composed of categorical, ordinal, interval, Likert, and open-ended response formats. I began with 11 categorical, or nominal, items to measure factual information and behavior. I used these items to find out more specifics than I would be able to using another format. For example, instead of just finding out if teachers thought assignments should be modified for ELLs, I asked how often they actually do this. Also, I was able to inquire about the specific nature of the

professional development the teachers may have received and the exact topics the teachers would like to learn about in future professional development sessions.

I included three ordinal items and three interval items. The ordinal items address the years completed as a school teacher, the number of times traveled to a non-English speaking country, and the length of time lived in a non-English speaking country. The interval items asked the teachers how many students they taught, how many ELLs they taught, and how many hours of professional development they have received.

After all the categorical, ordinal, and interval items, I used thirty-four 5-point Likert items to measure the intensity of the teachers' beliefs about ELLs in their classrooms. According to Bradburn, Sudman, and Wansink (2004), "The fundamental idea behind Likert scales is that an attitude can be thought of as a set of propositions about beliefs, evaluations, and actions held by individuals" (p. 126). Because Bradburn, Sudman, and Wansink believe that "middle-of-the-road or indifferent respondents should not be forced to express opinions" (p. 142), I included "neither agree nor disagree" as a response option. Thus, the 5 points on the Likert items are strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree.

I ended with five open-ended questionnaire items to give respondents an opportunity to either add more detail or say something that was not brought up through the other types of items. For example, I asked the respondents "What are some of the challenges you face with the ESOL students in your classes?". Bradburn, Sudman, and Wansink (2004) believe open-ended items can be valuable and advise researchers to pay attention to all responses, not just the most common ones.

Questionnaire sections. After deciding which items would be used, I organized them into meaningful sections. Section A focuses on factors that research has shown influence teachers' beliefs about ELLs (i.e., teaching experience, living in another country, training received in teaching ELLs, gender, languages spoken, travel experience, and the number of ELLs taught). This section also includes items about teachers' schools, and classroom experiences with ELLs. For example, because research suggests the population of ELLs can affect teachers' beliefs (Youngs & Youngs, 2001), I asked about the total number of students and the number of ELLs that the teachers teach. For record keeping purposes, Section A also includes an item that asks teachers to name their school system.

Section B asks teachers about their past professional development experiences. In addition, it focuses on what the teachers would like or need in the future to better serve ELLs in their classrooms.

Sections C and D include the Likert items about teacher beliefs, strategies, and professional development. These items follow the order listed in the conceptual framework (see Appendix A). I organized the items so those on a similar topic would be grouped together.

Section E contains the open-ended items. I felt that positioning the open-ended items at the end would allow the teachers to think about the previous items before answering. The open-ended items are (1) What are some of the challenges you face with the ESOL students in your classes?, (2) What do you like about teaching ESOL students in your mathematics classes?, (3) Please describe any strategies you use to help ESOL students in your classes., (4) In what ways do you feel the ESOL students in your

classroom do or do not have an equal opportunity to learn the material in your mathematics class?, and (5) Please write any additional comments you have about this questionnaire or about the inclusion of ESOL students in mainstream classrooms.

Focus group. I used a focus group at one middle school to pilot test the questionnaire. Focus groups are "a form of in-depth group interviewing conducted early in the questionnaire development cycle and can be used in a variety of ways to assess the question-answering process" (Scheuren, 2004, p. 33). According to Scheuren, focus groups allow researchers to observe a great deal of discussion on a topic in a limited period of time. For example, Grusin and Stone (1992) found that focus groups can help reveal poorly designed questionnaire items. Similarly, Frary (1996) advises researchers to get feedback on their initial list of items. Fowler (2002) recommends using focus groups with 6 to 8 people.

After obtaining permission from the University of Georgia Institutional Review Board (IRB), I conducted the focus group with 9 of the 10 mathematics teachers in one middle school. Because these 9 teachers participated in the focus group, they did not participate in the study. I recruited the teachers for the focus group through an email letter (see Appendix D). The teachers signed a consent form before participating (see Appendix E). Questions that were asked during the focus group are included as Appendix F.

Demographics of the focus group teachers were gathered from their questionnaire responses. One male and eight female teachers participated in the focus group. Except for one female, none of the teachers spoke a foreign language. Two of the teachers were in their first year of teaching, and one was in her second year. Two of the teachers had

between 6 and 10 years of experience, one had between 11 and 15 years, and three had 16 or more years.

The focus group teachers completed the questionnaire as a group on individual computers and were encouraged to raise any questions and make suggestions they thought of while completing it. After completing the questionnaire, I talked one-on-one with the teachers and asked what they thought particular items were asking and why they chose a particular answer over another (Bradburn, Sudman, & Wansink, 2004; Fowler, 2002).

The focus group determined that if all items were answered, the questionnaire would take approximately 15 minutes to complete. The teachers gave me suggestions on the layout of the questionnaire on the screen, such as all the answer choices should be visible at one time for a particular item. The teachers also pointed out that the item about how the ESOL program is structured needed to have the option to check all that apply. Based on the teachers' suggestions, the fourth open-ended questionnaire item was changed from asking in what ways they feel ELLs have an equal access to the curriculum to in what ways they have an equal opportunity to learn the material. When asked how many ELLs the teachers taught, a few teachers did not know, so I added instructions that participants may skip the question if they do not know this number. Likewise, because some teachers did not have an ESOL student in their class at the present time, they recommended adding "when you have an ESOL student in your class" to the beginning of the question asking how often they modify assignments for ELLs. In addition, I changed the Likert item from "students are best taught using direct instruction" to "direct instruction/lecture to the entire class" because this made more sense to the focus group.

The most significant change I decided upon based on the focus group was to allow teachers to fill out the questionnaire if they did not currently have an ESOL student, but had taught at least one the previous year. A few teachers in the focus group fell into this category yet thought they still had some important ideas they wanted to share on the questionnaire.

Student Interviews

Because teachers' beliefs can affect the students they teach, I interviewed four ELLs to provide student perspectives on being in mainstream classrooms. I sent an email (see Appendix G) requesting student interview recommendations to each of the 439 teachers in my sample, as well as the ESOL coordinators and school principals. Specifically, I asked teachers to recommend students whose English skills were strong enough to understand my questions and provide answers that I could understand. I received responses from seven teachers. However, four teachers did not respond to my follow-up email about scheduling a date. Also, one teacher was not able to obtain consent from the students' parents. Therefore, it was possible for me to interview only four students. Demographic information about the students is included in Table 1.

Students signed a minor assent form (see Appendix H) and had their parents sign a parental consent form (see Appendix I). These forms were also available in Spanish (see Appendix J). The Student Interview Protocol (see Appendix K) served as a guide for the interviews. The interviews lasted approximately one half to 1 hour each. The interviews were conducted in the schools of the students in conference rooms near the office. I tape recorded and later transcribed the interviews.

Table 1

ELL Interviewee Demographics

Student	Language	Grade	Gender	% ELL in County
Alicia	Spanish	6th	Female	10.4%
Carlos	Spanish	6th	Male	10.4%
Diego	Spanish	8th	Male	10.4%
Trong	Vietnamese	8th	Male	.4%

Note. All names are pseudonyms.

Teacher Interviews

In order to provide a more in-depth description of the teachers' beliefs than could be attained just through the questionnaire, I interviewed five teachers. The last item in the questionnaire asked for an email address for those willing to be interviewed. Of the 21 teachers who included their email on the questionnaire, 7 responded when I emailed them to set up an interview time. From those 7, I chose 5 teachers because they represented school systems with different size ESOL populations and with different programs in place to support ELLs. The teachers interviewed were all female. Table 2 provides demographic information on the 5 teachers I interviewed.

The interviews took place in the schools where the teachers worked and lasted approximately 1 to 2 hours each. A Teacher Interview Protocol (see Appendix L) served as a guide for the interviews; the guide was semi-structured and was driven by questions that emerged from the questionnaire data. I tape recorded and transcribed the interviews.

Research Design

Quantitative and qualitative methods were used to conduct this study. On the one hand, descriptive quantitative approaches are helpful in gaining an initial understanding of a construct, such as participant perceptions of their behaviors and practices, and identification of variables that influence this construct (Fraenkel & Wallen, 2000; Gay & Airasian, 2003). It is for this reason that I administered the questionnaire. On the other hand, qualitative approaches are best used when a deeper understanding of the issue is desired (Silverman, 2000). Similarly, deMarrais (2004) states that qualitative interviews

Table 2

Teacher Interviewee Demographics

Teacher	Grade Level	% ELL in County	ELL Program Type
Ana	6th	0.4%	Pull-out
Colleen	6th	10.4%	Inclusion/co-taught with ESOL teacher
Diane	7th	3.8%	International Center for recent immigrants
Hannah	8th	10.4%	Inclusion/co-taught with ESOL teacher
Linda	8th	0.4%	Pull-out

Note. All names are pseudonyms.

provide researchers with "in-depth knowledge from participants about particular phenomena, experiences, or sets of experiences" (p. 52). Therefore, I also conducted four student and five teacher interviews. Creswell (1994) labels this mixed method research design as a sequential dominant/less dominant design. Quantitative methodologies dominated the design, with qualitative interviews finishing a deeper description of participants' beliefs.

Procedures

First, I obtained permission to conduct the study from the school systems and the University of Georgia Institutional Review Board (IRB). Second, I gained access to the individual schools by contacting the principals. Third, I interviewed 4 students as described previously. Next, I administered the questionnaire to the teachers. The final method of data collection, as explained previously, involved interviewing 5 teachers. At the conclusion of the study, results will be shared with the principals and teachers in the participating schools.

Obtaining School System and School Participation

I used a combination of cluster and purposeful sampling to choose school systems that varied in size (see Appendix M) and location (see Appendix N) across Georgia to participate in the study. First, I divided all the school systems in Georgia into three clusters based on the sizes of the student populations in the school systems. Next, I further divided each of these clusters based on their ELL percentages (see Appendix O, Georgia Department of Education, 2007) because the number of ELLs that teachers have

in mainstream classrooms has been identified as a factor that influences teacher beliefs. Then, I used purposeful sampling from those clusters to choose school systems from different areas across Georgia. This process resulted in the identification of 16 school systems for possible participation in this study.

Next, I elicited participation in the study by emailing a letter (see Appendix P) to the appropriate administrator in each of the 16 school systems. The letter explained the purpose of the study and included a draft Participation Agreement Letter (see Appendix Q) for the administrators to sign and return if they agreed to participate. Of the 16 counties, 11 agreed to participate, 3 declined to participate, and 2 did not respond. The following school systems agreed to participate in the study: Crisp, Columbia, Decatur, Dekalb, Gainesville City, Gilmer, Habersham, Hall, Mitchell, Richmond, and Savannah-Chatham.

Dekalb County School System has a student population of over 99,000 and is located in Atlanta, a large city. According to NCES (2002a), a large city is defined as a central city of a Metropolitan Statistical Area (MSA) with the city having a population greater than or equal to 250,000. Columbia, Hall, Richmond, and Savannah-Chatham school systems have between 20,000 and 34,000 students (Georgia Department of Education, 2007). The remaining school systems (i.e., Crisp, Decatur, Gainesville City, Gilmer, Habersham, and Mitchell) are small schools systems with student populations between approximately 1,900 and 6,200. There were a total of 55 middle schools in the 11 participating school systems.

After I obtained the Participation Agreement Letters from the 11 school systems, I obtained permission from the University of Georgia Institutional Review Board (IRB) for

the Protection of Human Subjects to conduct this study. Next, I emailed a letter (see Appendix R) to the principals of the 55 schools explaining the purpose of the study and asking for their approval for me to email the questionnaire to the mathematics teachers in their schools. None of the principals declined their teachers' participation in the study. However, one principal requested I send emails just to her, and she would forward them on to the mathematics teachers in her school. I also emailed a letter (see Appendix S) to all the ESOL coordinators in the participating school systems asking them to encourage their mathematics teachers to participate in the study.

Administering the Teacher Questionnaire

There were 439 grades 6-8 mathematics teachers in the 55 participating schools. First, I obtained the email addresses of these 439 mathematics teachers by going online to the 55 schools' websites. Through various methods, I was almost always able to find the email addresses of the mathematics teachers online. However, the few times that information was unavailable, I contacted the principals of the schools for that information. All the principals agreed to share the teachers' email addresses.

Second, I sent an introductory email (see Appendix T) to the 439 teachers to encourage them to participate in the study. The letter described the purpose of the study and the questionnaire. Twenty-six of those emails were returned as undeliverable, but I left the addresses on my list in case it was just because of a full mailbox. I checked all the email addresses for accuracy and corrected a couple of typographical errors. When a school or system had a number of undeliverable emails, I contacted the principals and asked them to double check the email addresses. This happened three times.

To encourage teacher participation, the introductory email included an attachment of four resources that could be helpful in teaching ELLs (see Appendix U). The largest county in my sample did not allow incentives of any kind, so this is the most I could offer. The resources were titled (1) Approaches and Frameworks for Teaching ESOL Students, (2) Strategies and Tips to Teach ESOL Students in Your Regular Education Classroom, (3) Assessing ESOL Students in the Regular Education Classroom, and (4) Internet Resources for Teaching ESOL Students.

Third, I emailed a Questionnaire Cover Letter (see Appendix V) with the link to the questionnaire to all of the 439 teachers. This time, 16 email addresses were sent back as undeliverable. In addition, 4 teachers emailed back that they did not have any experience teaching ELLs, so I removed them from the list. After eliminating teachers who responded that they did not teach any ESOL students and those whose email addresses were undeliverable, the sample for the questionnaire was then 419.

Teachers had the option of completing the questionnaire online or printing it and mailing it back to me. The questionnaires were anonymous. Unless teachers opted to include their email address, there was no way to track participants' names to their questionnaire responses, which hopefully increased honesty and response rate in general. Because I was not able to identify nonrespondents, 2 weeks after the Questionnaire Cover Letter was emailed to the teachers, I emailed a follow-up letter (see Appendix W) to all the teachers except the four who initially responded that they did not have any experience teaching ELLs. The letter included the link to the questionnaire and thanked those who had completed it. Five teachers responded that they did not teach ELLs, so they were removed. One teacher emailed that she did not teach mathematics, so she was removed.

This made the final sample size 413. I sent a second follow-up email (see Appendix W) and included the resource attachment again. One week later, I sent a final reminder email. I closed the questionnaire down 2 weeks after the final reminder email was sent.

During the whole phase of sending emails about completing the questionnaire, only four teachers emailed me about having trouble filling it out online. Of these four teachers, I was able to convince one to print the questionnaire and mail it to me, and one teacher gave me her questionnaire as a paper copy when I went to her school to conduct a teacher interview.

Sharing the Results

After collecting all the questionnaire responses, I sent an email link to all teachers, principals, county personnel, and ESOL coordinators involved in the study for them to view the results through SurveyMonkey. At the end of this semester, I also plan to write a summary of the results, including the qualitative data, to share with everyone. At that time, I will also offer to email the complete dissertation to those who would prefer to see the entire document.

Analyses

I used a mixed research design of survey research followed by qualitative interviews. The questionnaire dominated the study and was analyzed through crosstabs, correlations, and analyses of variance (ANOVA). Statistical Package for the Social Sciences (SPSS) software was used to analyze the questionnaire results. I analyzed the open-ended items using content analysis. Qualitative analysis of coding and

categorization of interview data provided a deeper understanding of middle school mathematics teachers' beliefs about ELLs as well as information about the experiences of ELLs in mathematics classrooms.

CHAPTER 4

RESULTS

"Math is hard because I don't understand so much English, and that makes it hard."

--Diego, 8th grader from Mexico

The purpose of this study was to explore the beliefs middle school mathematics teachers have about the ELLs in their classrooms and the factors influencing those beliefs. In addition, I identified the strategies these mathematics teachers use to help the ELLs in their classrooms. I also explored the support teachers need to teach the ELLs in their classrooms. Finally, I learned how several ELLs feel in their mainstream mathematics classrooms. Specifically, the study addressed the following research questions:

1. What are the beliefs of middle school mathematics teachers about ELLs in mainstream classrooms?
2. What factors influence these beliefs?
3. What strategies, if any, do teachers use to help ELLs succeed?
4. What types of support are teachers receiving, and what additional support could they use to meet the needs of ELLs?
5. What are the experiences of ELLs in middle school mathematics classrooms?

This chapter is divided into four sections: (a) response rate, (b) demographic characteristics of questionnaire respondents, (c) preparation of the quantitative data, and (d) analyses.

Response Rate

Web-based questionnaires have been found to have lower response rates than equivalent mail questionnaires (Matz, 1999; Solomon, 2001). However, many strategies can be used to increase response rates in web-based questionnaires. For example, according to Solomon, response rates can be increased by using personalized email cover letters, simpler formats, and follow up reminders. I used all of these strategies in my study. It is also helpful to notify possible respondents ahead of time of the intent to survey (Solomon), which I did. Similarly, it is advantageous to personalize contacts through email and to keep the invitation brief (Archer, 2003; Dillman, 2000). Shannon, Johnson, Searcy, and Lott (2002) also found personalized prenotifications and follow-up reminders to help with nonresponse. For example, in my study, after the first day of emailing out the questionnaire link, 26 people responded. Within 2 days after the first reminder, the number of completed questionnaires rose from 42 to 95. Solomon found fancier questionnaires that take longer to load had lower response rates than relatively plain web questionnaires. Additionally, university sponsorship, which I possessed, has been show to increase response rate (Boser & Clark, 1995; Cui, 2003). Finally, throughout my study, I tried to convince respondents that their participation could make a difference.

Of the 413 questionnaires sent out by email, 146 were returned via the electronic website and 3 were returned in paper form, for a total of 149 responses. This constitutes a response rate of 36%.

Although I did my best to choose an appropriate sample, 43 respondents reported in the questionnaire that they did not teach any ELLs this year or last year. Data from these respondents were not included in the crosstabs, correlations, ANOVAs, or analyses of the open-ended items. After removing these 43 teachers who did not teach ELLs, I had 106 questionnaires. Unless otherwise specified, only these 106 participants are included in the statistical analyses. For comparison purposes, on the tables with Likert percentages, the last column shows the results of just the 43 teachers who reported that they did not teach any ELLs this year or last year.

The responses from participants were well dispersed among the 11 school systems. The overall response rate by school systems ranged from 12 to 100%. Specifically, 4 of the 11 participating school systems had response rates over 50%, and 4 were under 25%. The 43 respondents who did not teach any ELLs this year or last year came from five school systems, with 41 of the 43 from three school systems.

Although my goal was to have as high of rate of response as possible, low response rate does not automatically mean there is nonresponse error (Clark & Boser, 1995). Nonresponse error should be approached from the standpoint of representativeness of the respondents. According to Clark and Boser, high response rate is less important when conducting surveys of homogeneous populations. Methodologists (e.g., Huck, 2000) suggest when response rates may be in question, researchers can minimize the differences between respondents and nonrespondents if they can ascertain the differences that might exist between the two groups, such as age, experience, and socioeconomic level. As middle school mathematics teachers in the state of Georgia, my respondents were relatively similar demographically and have similar educational backgrounds.

Demographic Characteristics of Questionnaire Respondents

Data reported in this section are based on the 106 respondents who indicated they were currently teaching ELLs or did so last year. Not all numbers add to 106 because not all respondents answered all questions.

Eighteen of the respondents were male, and 87 were female. Twenty-three respondents indicated they spoke a language other than English, and 3 spoke more than one language other than English: 11 spoke Spanish, 7 French, 2 Korean, 2 German, and 1 of each of the following: Laotian, American Sign Language, Hindi, Gujarati, and Norwegian. Eighty-seven of the respondents never lived in a non-English speaking country for more than 1 month. One-hundred four respondents answered the question of how many students they taught mathematics to this year. This number ranged from 8 to 140 with a mean of 86.8. Also, the number of ELLs the respondents taught varied from 1 to 50 with a mean of 11.1. Tables 3 and 4 show the respondents' travel to non-English speaking countries and the number of years respondents completed as a school teacher, respectively.

Preparation of Quantitative Data

The quantitative data included 51 items from the questionnaire: 11 categorical, 3 ordinal, 3 interval and 34 Likert items. In addition, I created a new variable, ELL

Table 3

Times Respondents Traveled to a Non-English Speaking Country

Times Traveled	Frequency	%
0 times	39	37%
1 time	16	15%
2 times	20	19%
3-5 times	19	18%
6 or more times	10	9%
Not Reported	2	2%

Table 4

Number of Years Respondents Completed as a School Teacher

Years as a Teacher	Frequency	%
0 years	3	3%
1 year	9	8%
2-5 years	26	25%
6-10 years	22	21%
11-15 years	18	17%
16 or more years	26	24%
Not Reported	2	2%

percentage, by dividing the number of ELLs taught by the total number of students taught. Frequencies for these variables can be found in Appendix X.

Reverse coded items from the questionnaire. For ease of interpretation, six negatively worded Likert items (i.e., C3, C5, C7, C9, D2, and D12) were reverse coded before analysis. Responses of *not applicable* were coded as 8 and were removed before analysis. The frequencies for the reverse coded items can be found in Appendix Y.

Collapsed items from the questionnaire. In order to have large enough numbers for comparisons, the response options to three items were collapsed before analysis. I chose to combine response options that were the most related and that produced relatively equal group numbers. Specifically, the five possible response options to the item, "How many times have you traveled to a non-English speaking country in your lifetime?" were collapsed into three groups: 0 times (n = 39), 1 or 2 times (n = 36), and 3 or more times (n = 29). In addition, the item of how many years completed as a school teacher was reduced from six response options to three for analysis: 0 or 1 year (n = 12), 2 to 10 years (n = 48), and 11 or more years (n = 44). The five response options for the item "When you have an ESOL student in your class, how often do you modify assignments for an ESOL student?" were collapsed as follows: never or a couple times a year (n = 23), about once a week to once a month (n = 36), or almost everyday or everyday (n = 38). The frequencies for these collapsed variables are included in Appendix Y.

Analyses

I analyzed the results of the questionnaire using descriptive statistics, crosstabs, correlations, and ANOVAs. An alpha level of .05 was used for all statistical tests.

In addition, I analyzed the five open-ended questionnaire items and the interview data qualitatively. Initially, I used Strauss and Corbin's (1990) open coding system to write down any of my thoughts as I read the interview transcripts and open-ended responses. From there, codes were applied that resulted in categories, then themes (see Appendix Z). I used a combination of content and thematic analysis (Ezzy, 2002) because at times the categories were predetermined, yet other categories emerged from the data. In addition to analyzing the qualitative data as a whole, I also analyzed each group of open-ended questionnaire items based on the factors that have been shown to influence teachers' beliefs. For example, I went through and highlighted all the participants who reported that they spoke another language, and I read their open-ended responses. I then read the responses of those who did not speak another language to look for differences. I followed this procedure for gender, number of countries lived in, languages spoken, times traveled, years of teaching experience, ELL training, and percentage of ELLs in the teachers' classrooms. Results of the analyses for each research question follow.

Research Question 1

What are the beliefs of middle school mathematics teachers about ELLs in mainstream classrooms?

The first research question is best answered by reporting the percentages of 19 of the 34 Likert items from the questionnaire with support from the open-ended questionnaire items and interviews. In Table 5, I combined the responses of strongly agree and agree, as well as the responses of strongly disagree and disagree. The following sections are organized by categories and themes related to teachers' beliefs that I either asked about specifically in the questionnaire (see Appendix A, Questionnaire Conceptual Framework) or that emerged from analyzing the qualitative data (see Appendix Z).

Teachers' beliefs about the advantages of teaching ELLs. The questionnaire data indicated that 86% of teachers welcomed the inclusion of ELLs in their classes (Table 5, item C1). Additionally, 61% of teachers believed that the inclusion of ELLs in mainstream classes benefits all students (item C2). On the open-ended questionnaire items, teachers made many positive comments about ELLs. For example, 8 teachers mentioned ELLs being hard working or trying very hard; 7 teachers felt that ELLs were eager to learn or had a desire to learn. The most frequent comment, made by 10 teachers, was that they liked the diversity ELLs bring. For example, some teachers said they enjoyed learning about different cultures, backgrounds, and viewpoints from the ELLs in their classes.

One teacher I interviewed said that it helps broaden the thinking of the native English speaking students to have ELLs in their classes. This teacher also said the having more ELLs in class will "make you become more patient." Similarly, another teacher I interviewed said that the native English speakers benefited from seeing someone who did not speak English struggle through that process. When asked about the effects of ELLs

Table 5

Teachers' Beliefs about ELLs

	Taught ELLs			No ELLs
Questionnaire Sections, Numbers, and Items	Strongly Agree or Agree	Neither Agree nor Disagree	Strongly Disagree or Disagree	Strongly Agree or Agree
C1. I welcome the inclusion of ESOL students in my class.	86%	10%	4%	80%
C2. The inclusion of ESOL students in regular education classes benefits all students.	61%	25%	14%	68%
C3. ESOL students should not be included in regular education classes until they attain a minimum level of English proficiency.	54%	20%	26%	35%
C4. The inclusion of ESOL students in my classes increases my workload.	53%	21%	25%	47%
C5. The ESOL students in my class hinder the learning of the other students in the class.	8%	21%	71%	7%
C6. It is difficult for mainstream teachers to find enough time to deal with the needs of ESOL students.	50%	21%	29%	28%
C7. All things considered, I would rather not have ESOL students in my classes.	9%	27%	64%	15%
C8. When given proper support, I believe ESOL students can master the required curriculum.	92%	7%	1%	92%
C9. ESOL students should not use their native language at school.	22%	29%	49%	44%
C10. If students can speak English fluently with their friends, they should be able to understand the mathematics content as well as other students.	30%	22%	48%	37%

Questionnaire Sections, Numbers, and Items	Taught ELLs			No ELLs
	Strongly Agree or Agree	Neither Agree nor Disagree	Strongly Disagree or Disagree	Strongly Agree or Agree
C11. ESOL students should be able to acquire English within two years of enrolling in U.S. schools. .	33%	36%	31%	17%
C12. Language is not an issue in the mathematics classroom.	3%	9%	88%	5%
C13. Children all over the world learn mathematics the same way.	4%	9%	87%	8%
C15. I can adapt my instruction so that even those students with limited English proficiency can master the material in mathematics.	56%	24%	20%	49%
C16. I am good at helping ESOL students understand the material in my classes.	53%	29%	18%	33%
C17. Speaking English at home will facilitate English acquisition for ESOL students.	78%	16%	6%	68%
D12. I am not responsible for the mathematics achievement of students who have limited English proficiency.	5%	10%	85%	0%
D13. It is my responsibility to bring ESOL students up to the same level as other students mathematically.	74%	17%	9%	76%
D14. I have great control over the mathematical success of ESOL students in my class.	40%	38%	22%	45%
Note. Percentages do not always add up to 100 due to rounding.	N ranged from 92 to 105.			N ranged from 12 to 41.

on the other students in the class, another teacher I interviewed said, “I am a firm believer that difference helps everybody.”

Teachers’ beliefs about the challenges of teaching ELLs. As shown in Table 5, many of the teachers who completed the questionnaire felt overwhelmed with the challenge of meeting the needs of ELLs in their classrooms, primarily because of the language barrier (item C12) and a lack of time (C6). In one open-ended item, teachers reported the challenges they face; Table 6 summarizes the most frequent responses. In response to an open-ended item one teacher said, “There just isn’t adequate time to access their needs in a classroom with other students who speak English.” Related comments included, “I often do not have the time to teach all of the skills needed for their grade level” and “There is not enough time to cater to all students.” A common concern seems to be meeting the needs of the English-speaking students in a class with ELLs. For example, an open-ended item response read, “I understand what I am supposed to do for my students. But when I have an ESOL class, no ESOL co-teacher, and little training, I simply cannot sit down and modify 28 different lessons. It’s not feasible.” Similarly, a teacher reported during an interview, “When I didn’t have an ESOL teacher in the classroom, I just struggled, and it was all by myself. The native speaking English students were put on hold.” Additionally, two out of the five teachers I interviewed said that the native-English speakers suffered academically by having ELLs in their classrooms.

Teachers’ beliefs about placement of ELLs in mainstream classrooms. Although only one county had any type of all day placement for recent immigrants, 54% of the teachers believed ELLs should not be in mainstream classrooms until they reach a

Table 6

Challenges Faced by Teachers of ELLs in Mainstream Mathematics Classes

Challenge	Frequency
Language Barrier	9
Time (for planning, in the classroom)	6
Communication with parents	4
Communication with students	3
Word problems/vocabulary	2
"Some students are making no effort to become proficient in English"	1
"Students can and do exhibit racism"	1
Kids speaking their native languages	1
Impossible to "catch them up" in a classroom of 28	1
Lack of parent involvement	1

minimum level of English proficiency (Table 5, item C3). For example, a teacher responded to an open-ended item, "Students need to have at least some English proficiency to be placed in a regular math class." Another open-ended response read, "I think ESOL kids need basic language skills prior to going into any mainstream classroom … for their benefit and mine and the other kids."

Similarly, one teacher I interviewed said, "I think all students, especially if they come to us non-English speaking, need a beginning class, or to go to a school that's just for first year, beginning students, so they can at least have some acclamation when I say put your name on your paper, you understand what to do." According to another teacher I interviewed, ELLs are not even able to learn mathematics when they first arrive: "Can they learn the content? Not when they're first here, I mean, they've got so many other things to learn, just the behavior, the standard procedures, this school may be very different from where they came from. They may not have went to school, formal school, and so there are so many factors."

On the other hand, two comments were made in the open-ended section of the questionnaire indicating teachers' support for inclusion of ELLs in mainstream classrooms. One comment read, "I think inclusion is the best way if the teacher is equipped with the tools that will help these students." Similarly, a questionnaire respondent stated, "The inclusion of ESOL allows students to experience a diverse atmosphere which is relative to the global society."

Teachers' beliefs about reading in mathematics. Reading skills are important for success in mathematics (Grimm, 2008). According to Muth (1993), reading, particularly in word problems, plays an important role in mathematics learning. Although not

addressed through any of the quantitative data, the open-ended questionnaire data and interviews indicated that regarding the success of ELLs in their classrooms, word problems and the amount of reading in the mathematics curriculum concern teachers. On an open-ended response, one teacher wrote, "So much now is reliant on reading. It's not just numbers in mathematics, and with the new standards it's even more so. When they have to read, they can't solve the problem." Other open-ended responses were "verbal expressions and word problems are very hard for them" and "when problem-solving, they don't have an equal opportunity to master the content because of the reading that's required." During an interview, one teacher gave a specific example about a difficult word problem. She said, "From the CRCT Coach books, probability problems, if they are sitting there trying to figure out about the marbles in the bag, and then you do this, and you put the marble back after a draw, that falls back to English." Another teacher I interviewed commented, "Reading is an issue."

Many participants on the open-ended items and during interviews reported specifically about the emphasis on word problems in the Georgia Performance Standards (GPS). For example, open-ended item responses read, "It has been more difficult since GPS" and "ESOL students often have difficulty with the heavily-worded mathematics problems of Georgia's new curriculum." Similarly, a teacher I interviewed said, "There's an awful lot more vocab in mathematics than people realize, with GPS especially!"

Teachers' beliefs about vocabulary in mathematics. The topic of vocabulary in mathematics was not explicitly addressed in the quantitative sections of the questionnaire. However, the open-ended items and interview data indicated that teachers believed that even if ELLs can read the word problems and directions, the vocabulary of mathematics

can be difficult for them. For example, teachers wrote on open-ended item responses that "the vocab is hard to understand," "language is an issue with terminology," "vocabulary plays such a big part in math," and "when teaching math, there is a lot of vocabulary." During interviews, other teachers gave specific examples of terms that have proven to be difficult for ELLs. For example, one teacher commented that the term "reciprocal" was confusing until she told them to flip the fraction. Another teacher I interviewed said that when she was teaching probability, one direction read "draw a tile out of a bag." This teacher pointed out that to an ELL, "draw" means to create a picture. Similarly, another teacher I interviewed gave the following example:

> We had a cylinder of beans, and we're talking about the volume, and if we scooped out a cup, how much was left, ESOL students don't understand "scooped out." Some of the phrases that are being used in our assessment still need some work because our ESOL students don't know what some of those little short phrases were.

Teachers' beliefs about the language barrier in mathematics. Trying to communicate with ELLs is challenging for many teachers. Specifically, only 3% reported on the questionnaire that they agree or strongly agree that language is not an issue (Table 5, item C12). According to one teacher's response to an open-ended item, "Language learning gets in the way of math learning." Another participant responded to an open-ended item by commenting, "While numbers are a universal language, mathematics is not. It requires a great deal of language if taught correctly." Others voiced their frustrations on the questionnaire in the following ways:

- How can I possibly teach complicated concepts to someone who speaks no English?
- If you cannot speak or understand the language, then how can you understand the directions or examples?
- ESOL students will always miss out on the classroom discussions because they cannot access the language.

Similarly, during an interview, one teacher commented that language is an issue and then later stated, "Language is a barrier in the mathematics classroom, a huge barrier." Additionally, another teacher I interviewed said, "I just get frustrated if I can't hold a conversation with them. It's just so frustrating, but I'm sure it's frustrating for them." Moreover, a teacher confessed during an interview, "If they don't understand me, and I can't understand them, I don't know how to teach them."

Teachers' beliefs about students' use of their native language. As seen in Table 5, 78% of teachers believed speaking English at home will facilitate English acquisition for ELLs (item C17). Additionally, results of the questionnaire indicated that 49% of teachers believed there is a place for the use of native languages in their classrooms (item C9). For example, during an interview, one teacher told me she thought it was good for the other students to hear different languages spoken. Other teachers interviewed mentioned that using a native language is appropriate sometimes, but they still had their reservations. For example, one teacher I interviewed made the following comment:

> I don't want them using it as a crutch, but if we can use it to do the English and their native language and parallel and start drawing some similarities to help bridge the gap, I don't see a problem with it.

Similarly, a different teacher said during an interview,

> I think that your culture should always stay with you, and you should not be deprived just because you are going in another setting. Now I'm not saying use it all the time. But your culture is your culture, and that's something that's God given, and therefore you should be proud of it. But as far as trying to communicate with people when they're NOT of that language, then no.

On the other hand, other teachers indicated opposition to students' use of their native language in the classroom. For example, a teacher responded to the open-ended item asking "What are some of the challenges you face with the ELLs in your classes?" with, "The kids speaking their native language when talking with other students." Additionally, another teacher responded to this open-ended item by stating, "The challenge comes in when they begin to speak in Spanish and you aren't sure if they are staying on task." Similarly, one teacher I interviewed expressed her disapproval in this way:

> In every class they love to speak Spanish, and I'll say ENGLISH, ENGLISH, ENGLISH. If you've had three years of English, speak it! Speak the language of English, not Spanish! If I've been taught Spanish for two years, my third year, I would be expected to be able to speak Spanish. WE need to start expecting that of our Spanish students speaking English.

Nevertheless, one student interviewed said, "When I don't know something, I talk to my friends in Spanish and they explain."

Teachers' beliefs about their responsibility for ELLs. As seen in Table 5, only 9% of teachers believed that it is not their responsibility to bring ELLs up to the same level as

other students mathematically (item D13). For example, one teacher I interviewed said, "If there is just no attempt made, then it's not my responsibility. You just can't be all to everybody all the time." Moreover, two out of the five teachers interviewed made references to "our kids" when referring to native English speakers. The open-ended questionnaire data provided no additional information concerning this belief.

Teachers' beliefs about assessing ELLs. Respondents to the open-ended items and the teachers I interviewed reported strong feelings on the topic of assessing ELLs. For example, an open-ended comment read, "Our performance standards don't take ESOL students into consideration. Similarly, one participant indicated an administrator was not holding ELLs to a high standard. The open-ended response read, "Some of the ones I have know that they will pass and do nothing in my classes. We are told to just give them a 70. That is not fair."

One teacher I interviewed said**,** "Most of our assessments are performance based now, and it's the language that always bogs down the ESOL students. How can we use the EXACT same assessment and expect the SAME thing from our non-English speakers?" Another teacher I interviewed also felt ELLs should be assessed differently than other students:

> If they can't do basic computation, then they should fail, but if you are struggling with the language, but you can just put the mathematics down, show me this, I don't see where failing a student would be a benefit.

Similarly, another teacher I interviewed said, "If it's a language barrier, I don't believe you should grade them, but if it's a skill barrier, you need to grade them."

The results of the five interviews suggest that teachers' concerns about assessing ELLs go beyond the classroom to include standardized tests as well. For example, one teacher I interviewed said, "If they don't give them the CRCT in Spanish, it's just totally unfair. They don't even stand a good chance." Another teacher described her opposition to giving a recent immigrant a test in English. She said during an interview, "He was exempt from CRCT, but I'm pretty sure he took the mathematics, and I'm like I don't understand. I just don't think it's fair. You aren't really able to assess their abilities."

Teachers' beliefs about parents of ELLs. Although I did not ask specifically about parents speaking English, a few teachers commented that not speaking English at home was an indication of a lack of support for school. One teacher stated during an interview that "when the parents aren't trying to speak English, it's almost like the parents aren't supportive of what you are trying to do at school." Similarly, another teacher I interviewed said:

> We're just really bending over backwards when this is the country they've decided to move to. What don't you speak more English? Why are you speaking Spanish all the time and teaching your children *only* [italics added] Spanish, it's not helping them, and it's not helping the parents either. We'd like to see parents care as much as the teachers do in every way.

Teachers' beliefs about ELLs' home support. The idea that ELLs do not have the support they need from home was frequently mentioned as a challenge to teachers. For example, an open-ended response read, "Going home and not having very much support is a huge issue! It's not so much parents don't care, rather they *cannot* [italics added] really help them with most assignments!" Similarly, a teacher reported in an interview

that “the parent support is just not there, so unless they get it in the classroom, don’t expect them to get it at home.” And according to another teacher I interviewed, “The support at home makes all the difference in the success you see in the classroom.” Another interview participant divulged, “I don’t think they are real strict about making them go to school down there. You can quit school when you are like 9 or something.”

One teacher placed the responsibility of success at school back on the ELL. For example, an open-ended item response read, “Some use the language barrier as an excuse not to do anything! Some have already shut down or just don’t care. They may not have the support at home, but are not trying to get out of the rut.”

Research Question 2

What factors influence these beliefs?

The factors addressed in this section include teaching experience, having lived in a non-English speaking country, ELL training received, gender, languages spoken, travel experience, and ELL percentages. I used crosstabs, correlations, and one-way ANOVAs to answer this research question. In the ANOVA tables, the means are from Likert items in which strongly disagree was coded as “1”, disagree was coded as “2”, neither agree nor disagree was “3”, agree was “4”, and strongly agree was “5.” Therefore, a mean of 5 indicates that all teachers strongly agreed with the statement.

Teaching experience. Crosstab analysis indicated that teaching experience is not related to the frequency with which teachers modify assignments for ELLs (see Table 7). However, although not significant, results indicated that 40% of teachers with 0 or 1 year experience never or only modify a couple times a year, while 49% with 11 or more years of experience modify assignments almost daily. Additionally, one-way ANOVA

Table 7

Frequency of Modifying Assignments (Collapsed) by Years Teaching Experience (Collapsed)

Frequency of Modified Assignments	Teaching Experience			
	0 or 1 year	2-10 years	11 or more years	Total
Never or a couple times a year	4 (40%)	13 (29%)	5 (12%)	22 (23%)
About once a week or about once a month	4 (40%)	16 (36%)	16 (39%)	36 (37%)
Almost everyday or everyday	2 (20%)	16 (36%)	20 (49%)	38 (40%)
Total	10 (100%)	45 (101%)	41 (100%)	96 (100%)

Note. Percentages do not always add up to 100 due to rounding. $X^2(4, N = 96) = 6.15$. Cramer's $V = .18$. $p > .05$.

indicated that the number of years a teacher had completed as a school teacher did not make a significant difference on any of the Likert items on teacher beliefs (see Table 8).

Although the quantitative data did not indicate significant differences in relation to teacher experience, the open-ended item responses and interviews yielded some interesting findings. For example, responses to the open-ended items indicated that half of the teachers who listed parent communication as a challenge in teaching ELLs had either 0 or 1 year teaching experience. However, those with 16 or more years experience listed "time" most frequently as a challenge. Additionally, on the open-ended questionnaire item about what teachers like about teaching ELLs, those with 0 or 1 year experience reported that they liked learning about different viewpoints and the sharing of cultures, while the teachers with 16 or more years experience more frequently said they liked that ELLs were very motivated to learn. The strategies reported on the open-ended questionnaire items were no different based on years teaching experience. Furthermore, on the last two open-ended items about the ways ELLs did or did not have an equal opportunity to learn mathematics, the teachers with 16 or more years of teaching experience often wrote about the difficulties ELLs have with the new curriculum.

Having lived in a non-English speaking country. Having lived in a non-English speaking country was not significantly related to the frequency with which teachers modified assignments (see Table 9). Additionally, teachers who had lived in a non-English speaking country were not significantly different from the teachers who had not on any of the teacher belief variables (see Table 10). However, when analyzing the open-ended questionnaire items, I found that the teachers who had lived in another country

Table 8

Means of Teacher Belief Variables against Teaching Experience (Collapsed)

Questionnaire Items Related to Teacher Beliefs	0 or 1 Year Teaching Experience[a]	2-10 Years Teaching Experience[b]	11 or More Years Teaching Experience[c]
I would rather not have ESOL students in my classes. (reverse coded)	3.64	4.02	3.66
I welcome the inclusion of ESOL students in my class.	4.00	4.53	4.30
It is difficult for mainstream teachers to find enough time to deal with the needs of ESOL students.	3.36	3.13	3.50
Teachers should modify assignments for ESOL students in regular education classes.	3.36	3.86	3.78
It is my responsibility to bring ESOL students up to the same level as other students mathematically.	4.11	3.95	3.54
I am well prepared to teach the ESOL students in my classes.	2.30	2.54	2.95
The inclusion of ESOL students in my classes increases my workload.	3.82	3.09	3.45
The ESOL students in my class hinder the learning of the other students in the class.(reverse coded)	3.82	3.90	3.63

Note. N ranged from 90 to 100.

[a]*n* ranged from 9 to 11. [b]*n* ranged from 43 to 48. [c]*n* ranged from 37 to 44.

All *p*s > .05.

Table 9

Frequency of Modifying Assignments (Collapsed) by Lived in a Non-English Speaking Country (Collapsed)

Frequency of Modified Assignments	Lived in a Non-English Speaking Country		Total
	Yes	No	
Never or a couple times a year	4 (29%)	19 (24%)	23 (24%)
About once a week or about once a month	4 (29%)	31 (38%)	35 (37%)
Almost everyday or everyday	6 (43%)	31 (38%)	37 (39%)
Total	14 (101%)	81 (100%)	95 (100%)

Note. Percentages do not always add up to 100 due to rounding. $X^2(2, N = 95) = .50$. Cramer's $V = .07$. $p > .05$.

Table 10

Means of Teacher Belief Variables against Having Lived in a Non-English Speaking Country

Questionnaire Items Related to Teacher Beliefs	Lived in a Non-English Speaking Country	
	Yes[a]	No[b]
I can adapt my instruction so that even those students with limited English proficiency can master the material in mathematics.	3.20	3.45
I welcome the inclusion of ESOL students in my class.	4.53	4.35
I would rather not have ESOL students in my classes. (reverse coded)	4.00	3.78
The ESOL students in my class hinder the learning of the other students in the class. (reverse coded)	4.01	3.74
Teachers should modify assignments for ESOL students in regular education classes.	4.07	3.75

Note. N ranged from 94 to 101.

[a]*n* ranged from 14 to 16. [b]*n* ranged from 80 to 86.

All *p*s > than .05.

included the use of a native language as a strategy to help meet the needs of ELLs far more often than those who had not lived in another country.

Having received training. Analyses of variance indicated that teachers who had received training in teaching ELLs were significantly different from those who had not on four teacher belief variables (see Table 11). Specifically, teachers who had received training felt significantly more prepared to teach ELLs and to help them understand class materials than did teachers who had not received training. In addition, teachers who received training were significantly less likely to agree that if students can speak English fluently with their friends, they should be able to understand the mathematics content as well as others. Likewise, the teachers with training were significantly less likely to agree that students should be able to acquire English within 2 years of enrolling in U.S. schools. The results from the open-ended items on the questionnaire did not indicate any differences between those who had received training and those who had not.

Gender. Females were significantly more likely than males to agree that teachers should modify assignments for ELLs (see Table 12). However, gender was not significantly related to the frequency with which teachers reported that they actually did modify their assignments (see Table 13). When analyzing the open-ended questionnaire items, I found that a greater percentage of males than females reported using a native language as a strategy to teach ELLs. No other differences were apparent in the qualitative data.

Languages spoken. Quantitative results of the questionnaire indicated that teachers who speak another language did not differ significantly from teachers who do

Table 11

Means of Teacher Belief Variables against Training Received

Questionnaire Items Related to Teacher Beliefs	Training Received[a]	Training Not Received[b]	*p* value	Eta squared
I am well prepared to teach the ESOL students in my classes.	3.04	2.40	.001	.101
I am good at helping ESOL students understand the material in my classes.	3.69	3.20	.006	.076
If students can speak English fluently with their friends, they should be able to understand the mathematics content as well as other students.	2.56	3.02	.036	.043
ESOL students should be able to acquire English within two years of enrolling in U.S. schools.	2.75	3.20	.018	.055
I am not responsible for the mathematics achievement of students who have limited English proficiency. (reverse coded)	4.20	4.04	> .05	

Questionnaire Items Related to Teacher Beliefs	Training Received[a]	Training Not Received[b]	*p* value
I would rather not have ESOL students in my classes. (reverse coded)	3.88	3.80	> .05
Speaking English at home will facilitate English acquisition for ESOL students.	4.02	4.02	> .05
I welcome the inclusion of ESOL students in my class.	4.54	4.24	> .05
I can adapt my instruction so that even those students with limited English proficiency can master the material in mathematics.	3.63	3.30	> .05
Teachers should modify assignments for ESOL students in regular education classes.	3.85	3.69	> .05
The ESOL students in my class hinder the learning of the other students in the class. (reverse coded)	3.96	3.71	> .05

Note. N ranged from 90 to 103.

[a]*n* ranged from 45 to 48. [b]*n* ranged from 45 to 55.

Table 12

Means of Teacher Belief Variables against Gender

Questionnaire Items Related to Teacher Beliefs	Male[a]	Female[b]	*p* value	Eta squared
Teachers should modify assignments for ESOL students in regular education classes.	3.41	3.85	.041	.044
I would rather not have ESOL students in my classes. (reverse coded)	3.67	3.87	> . 05	
I welcome the inclusion of ESOL students in my class.	4.28	4.40	> . 05	
The ESOL students in my class hinder the learning of the other students in the class. (reverse coded)	3.94	3.83	> . 05	

Note. N ranged from 96 to 104.

[a]*n* ranged from 17 to 18. [b]*n* ranged from 79 to 86.

Table 13

Frequency of Modifying Assignments (Collapsed) by Gender

Frequency of Modified Assignments	Male	Female	Total
Never or a couple times a year	6 (43%)	17 (20%)	23 (24%)
About once a week or about once a month	2 (14%)	34 (41%)	36 (37%)
Almost everyday or everyday	6 (43%)	32 (39%)	38 (39%)
Total	14 (100%)	83 (100%)	97 (100%)

Note. $X^2(2, N = 97) = 4.88$. Cramer's $V = .22$.

$p > .05$.

not speak another language on any of the teacher belief variables (see Table 14) or the frequency with which they modified their assignments (see Table 15).

However, of the 13 teachers who responded to the open-ended items that they spoke another language, 31% (n = 4) mentioned the use of a native language as a strategy to help the ELLs in their classrooms, while only 16% (n = 6) of the 37 teachers who did not speak another language reported using this strategy. The interview data provided no additional information on the factor of speaking another language.

Travel experience. The number of times a teacher had traveled to a non-English speaking country was not significantly related to any of the teacher belief variables (see Table 16). However, the qualitative analysis of the open-ended responses on the questionnaire, indicated that 24% (n = 4) of the teachers who had traveled to a non-English speaking country listed use of a native language as a strategy, while only 19% (n = 7) of teachers who had not listed it as a strategy. For example, one teacher who had traveled to a non-English speaking country reported, "I do translate some of the math vocabulary into Spanish (or their native language)." On the other hand, one teacher who had never traveled to a non-English speaking country reported on an open-ended item that he or she makes ELLs say the mathematics rules in English to help them remember them. The interview data provided no additional information concerning this teacher belief.

ELL percentage. The percentage of ELLs that teachers taught was calculated by dividing the total number of ELLs taught by the total number of students taught. The percentage of ELLs in a teacher's classroom was not significantly related to any of the teacher belief variables (all ps > .05).

Table 14

Means of Teacher Belief Variables against Speaking another Language

Questionnaire Items Related to Teacher Beliefs	Other Language Spoken[a]	Other Language Not Spoken[b]
I welcome the inclusion of ESOL students in my class.	4.32	4.40
I would rather not have ESOL students in my classes. (reverse coded)	3.80	3.86
The ESOL students in my class hinder the learning of the other students in the class. (reverse coded)	3.43	3.87
I believe ESOL students can master the required curriculum.	4.47	4.39
ESOL students should not use their native language at school. (reverse coded).	2.42	2.75
ESOL students should not be included in regular education classes until they attain a minimum level of English proficiency. (reverse coded)	3.45	3.43

Note. N ranged from 99 to 103.

[a]*n* ranged from 19 to 20. [b]*n* ranged from 80 to 83.

All *p*s > .05.

Table 15

Frequency of Modifying Assignments (Collapsed) by Speaking another Language

Frequency of Modified Assignments	Other Language Spoken	Other Language Not Spoken	Total
Never or a couple times a year	4 (21%)	19 (25%)	23 (24%)
About once a week or about once a month	7 (37%)	28 (36%)	35 (36%)
Almost everyday or everyday	8 (42%)	30 (39%)	38 (40%)
Total	19 (100%)	77 (100%)	96 (100%)

Note. $X^2(2, N = 96) = .12$. Cramer's $V = .04$.

$p > .05$.

Table 16

Means of Teacher Belief Variables against Number of Times Traveled to a Non-English Speaking Country (Collapsed)

Questionnaire Items Related to Teacher Beliefs	0 Times[a]	1 or 2 Times[b]	3 or More Times[c]
I welcome the inclusion of ESOL students in my class.	4.32	4.26	4.61
Teachers should modify assignments for ESOL students in regular education classes.	3.68	3.73	4.04
ESOL students should not use their native language at school. (reverse coded)	2.58	2.71	2.79
The ESOL students in my class hinder the learning of the other students in the class. (reverse coded)	3.79	3.77	3.79
I would rather not have ESOL students in my classes. (reverse coded)	3.69	3.97	3.83

Note. N ranged from 95 to 103.

[a]*n* ranged from 34 to 38. [b]*n* ranged from 33 to 35. [c]*n* ranged from 28 to 29.

All *p*s > .05.

However, the qualitative data indicated that some teachers believed having more ELLs together in a classroom would make meeting their needs more manageable. For example, one teacher I interviewed commented, "It would be incredibly difficult if we had like a handful of ESOL kids. How are you going to have a student interpret for you? I would prefer to have one class with a significant amount rather than having them spread out over four classes." Similarly, another teacher I interviewed mentioned that she thought it is easier to teach ELLs when there are more of them. In analyzing the open-ended responses from the questionnaire, I found that the teachers with more ELLs were more likely to list group work as a strategy to help the ELLs in their classes understand the mathematics material than teachers who had fewer ELLs in their classrooms. Many of the teachers who had over 30% ELLs in their classrooms reported in the open-ended items that they need more help to meet the needs of these students.

Research Question 3

What strategies, if any, do teachers use to help ELLs succeed?

The questionnaire and the teacher and student interviews provided data to answer this question. For the quantitative analyses, I report percentages based on teachers' beliefs about using different strategies with ELLs, as well as what they reported actually doing in the classroom to modify assignments. Additionally, I ran one-way ANOVAs and a crosstab to see if having training in teaching ELLs affected the teachers' beliefs and actions about strategies to help ELLs. For the qualitative data, I looked at the open-ended item "Please describe any strategies you use to help ESOL students in your classes." I also asked the students during their interviews what types of things teachers do to help them learn math better.

Research question 3 quantitative analyses. Teachers who had received training in teaching ELLs reported using differentiation to meet the needs of the ELLs in their classrooms significantly more than those who had not received training (see Table 17). However, teachers who had received training were not significantly different from those who had not concerning how often they reported using collaborative learning or their beliefs about direct instruction (see Table 17).

In addition, having received training in the area of teaching ELLs was significantly related to the frequency of modifying assignments (See Table 18). Follow-up crosstabs indicated that teachers who modified almost everyday were significantly more likely to have received training than those who modified about once a week or about once a month, $X^2(1, N = 73) = 7.14$, $p = .007$). In addition, teachers who modified almost everyday were significantly more likely to have received training than those who never modified $X^2(1, N = 60) = 10.79$, $p = .001$.

The teachers reported using collaborative learning (81%) and differentiation (77%) to meet the needs of ELLs in their classrooms (see items D10 and D11, Table 19). Only 5% strongly agreed or agreed that ELLs are best taught using direct instruction (see item D9).

The participants had mixed views on assessing ELLs (see Table 19). For example, teachers were divided (Strongly Agree / Agree, 44%; Strongly Disagree / Disagree, 34%) on whether they should give ELLs a failing grade if they show effort (see item D5). Similarly, a little over half (52%) of the teachers agreed or strongly agreed that ELLs should not be graded on work they cannot read (item D6), while 20% disagreed or strongly disagreed. In addition, 56% strongly agreed or agreed that ELLs can show

Table 17

Means of Teacher Strategy Variables against Training Received

Questionnaire Items Related to Strategies	Training Received[a]	Training Not Received[b]	*p* value	Eta squared
I use differentiation to meet the needs of the ESOL students in my classes.	4.20	3.67	.001	.115
I use collaborative learning to meet the needs of the ESOL students in the classes.	3.98	4.02	> . 05	
ESOL students are best taught using direct instruction/lecture to the entire class.	2.35	2.42	> . 05	

Note. N ranged from 87 to 91.

[a]*n* ranged from 45 to 46. [b]*n* ranged from 42 to 45.

Table 18

Frequency of Modifying Assignments (Collapsed) by Training Received

Frequency of Modified Assignments	Training Received	Training Not Received	Total
Never or a couple times a year	6 (13%)	16 (33%)	22 (23%)
About once a week or about once a month	14 (30%)	21 (44%)	35 (37%)
Almost everyday or everyday	27 (57%)	11 (23%)	38 (40%)
Total	47 (100%)	48 (100%)	95 (100%)

Note. $X^2(2, N = 95) = 12.67$. Cramer's $V = .37$.

$p < .01$.

Table 19

Likert Item Responses Related to Teacher Strategies

	Taught ELLs			No ELLs
Teacher Strategy Variables	Strongly Agree or Agree	Neither Agree nor Disagree	Strongly Disagree or Disagree	Strongly Agree or Agree
D2. It is unfair to make classwork modifications for ESOL students. (reverse coded)	3%	13%	84%	9%
D3. It is good practice to allow ESOL students additional time to complete coursework and assignments.	82%	14%	4%	72%
D4. When helpful, it is good practice to read quizzes and tests aloud to ESOL students.	72%	20%	8%	75%
D5. Teachers should not give ESOL students a failing grade if the students show effort.	44%	22%	34%	23%
D6. ESOL students should not be graded on work that they cannot read.	52%	28%	20%	63%

	Taught ELLs			No ELLs
Teacher Strategy Variables	Strongly Agree or Agree	Neither Agree nor Disagree	Strongly Disagree or Disagree	Strongly Agree or Agree
D7. Teachers should modify assignments for ESOL students in regular education classes.	70%	24%	6%	81%
D8. ESOL students can show understanding on a few mathematics exercises, rather than be given the whole assignment.	56%	23%	21%	50%
D9. ESOL students are best taught using direct instruction/lecture to the entire class.	5%	32%	63%	0%
D10. I use collaborative learning as a strategy to teach my ESOL students.	81%	16%	3%	91%
D11. I use differentiation to meet the needs of the ESOL students in my classes.	77%	17%	6%	82%
	N ranged from 92 to 105.			N ranged from 12 to 41.

understanding on a few exercises, rather than be given the whole assignment (item D8). In addition, a decisive majority (70%) believed that teachers should modify assignments for ELLs (D7), and 82% thought it is good practice to allow ELLs additional time to complete assignments (D3).

The 43 teachers who completed the questionnaire even though they reported having not taught any ELLs this year or last year had similar beliefs to the teachers with ELLs in their classrooms (see Table 19). However, there appears to be one difference between the two groups. Only 23% of the teachers who do not teach ELLs strongly agreed or agreed that teachers should not give ESOL students a failing grade if they show effort, while 44% of teachers who do teach ELLs strongly agreed or agreed with the statement (see item D5).

Although 84% of respondents strongly disagreed or disagreed that it is unfair to make modifications for ELLs (see Table 19, item D2), teachers who had ELLs in their classrooms reported actually modifying their assignments at varying rates (see Table 20). For example, 39% reported modifying assignments almost everyday or everyday, while 19% reported never modifying their assignments.

Research question 3 qualitative analyses. On the open-ended items and in the interviews, many teachers expressed the idea that modifications were not necessary. For example, one teacher admitted that he or she was not meeting the needs of ELLs. The open-ended comment read, “ESOL students do not have an equal opportunity to learn the material in my mathematics class because I normally teach as though they do not have an Individualized Education Plan.” Additionally, one teacher I interviewed said, “They’re no different from the other kids.” Similarly, during an interview, another teacher said, “Once

Table 20

How Often Do You Modify Assignments for an ESOL Student?

Frequency of Modifying Assignments	N (Total = 97)	%
Never	18	19%
A couple times a year	5	5%
About once a month	10	10%
About once a week	26	27%
Almost everyday or everyday	38	39%

I'm teaching the mathematics, I don't see it [being an ELL] as a benefit or disadvantage. They are another student in the class." Another teacher made the following comment during an interview, suggesting that she was against modifications in her mainstream classroom:

> I don't modify assignments. When we get them, they go first to the international center, and then they come here and there is an ESOL person that works with them, and they are taken out. That's a class like any other class, so when they come into *my* [italics added] classroom, there's nothing there for modification.

However, on the open-ended questionnaire items, teachers reported using a variety of strategies other than modification to meet the needs of the ELLs in their classrooms. The most frequently named strategy was to provide ELLs with a peer tutor or peer buddy. Table 21 shows the frequency with which the strategies were listed. In addition to the strategies listed in the Table 21, the following strategies were listed once: multicultural activities, repeat instructions slowly, play games, have students play teacher and work at the board, and have students keep vocabulary dictionaries.

The student interviews also provided qualitative data about the strategies teachers use to help ELLs. When asked "What would help you understand math better?" students provided a variety of suggestions (see Table 22).

Even though students mentioned bilingual resources as an effective strategy to help them understand mathematics better (see Table 22), sometimes translating material into students' native language is not adequate. For example, I asked the Vietnamese student to tell me about a time he couldn't understand something in math. He responded, "Last year we had to use all the words of geometry and present. I don't even know it in

Table 21

Strategies Teachers Used to Help ELLs

Strategy	Frequency
Peer Buddy	25
Adjusted/modified assignments	14
Small group	13
Visual representations/pictures	10
Individualized Instruction	6
Hands-on activities/manipulatives	5
Assignments in Spanish	5
Collaboration with ESOL teacher	3
Technology	3
Pointing and gesturing	3
Use of their native language	3
Extended time	2
Differentiation	2
Read work for them	2
Spanish glossary	2
After school or morning tutoring	2

Table 22

Quotes From Students in Response to the Question "What Would Help You Understand Math Better?"

Strategies	Quotes
Collaborative Learning	Working with partners. Helps more when American. I think working with friends. Group work.
Providing Examples	Give more examples. I would like more examples. Could give more example.
Games	With games. It's better playing games in math. I had fun when playing a game.
Bilingual Resources	Spanish book and English book so you can see Spanish and English. More Spanish things.
Individual Help	Come and help me individual.
Ask ESOL Teacher	When I don't know something, I ask my ESOL teacher, and she tells to me things.

Vietnamese because in sixth grades I don't know those things, so if you translate, I still don't know**."**

In summary, teachers believed it is important to use different strategies and modifications to help the ELLs in their classrooms to be successful. However, teachers were divided on whether they actually put these beliefs into practice. The teachers who had received training to help ELLs used differentiation and modified assignments significantly more than those without training. Student interview participants provided additional suggestions for teachers to use.

Research Question 4

What types of support are teachers receiving, and what additional resources could they use to meet the needs of ELLs?

The data used to answer this question came from descriptive statistics from the questionnaire, correlations, open-ended questionnaire responses, and the teacher interviews. Many questionnaire items asked specifically about how much training teachers had received and if they would like more. Other Likert items on the questionnaire addressed the subject of resources. Additionally, in the open-ended items and during the interviews, teachers made comments about needing resources and professional development. Following is the analysis of this data related to teacher resources and training.

Research question 4 quantitative analysis. Only 25% of the teachers who teach ELLs and answered the question about preparation to teach ELLs felt they were well prepared (see Table 23). In addition, 74% of teachers would like to receive more training to help ELLs.

Table 23

Teachers' Support and Resources

	Taught ELLs			No ELLs
Questionnaire Items Related to Teachers' Support and Resources	Strongly Agree or Agree	Neither Agree nor Disagree	Strongly Disagree or Disagree	Strongly Agree or Agree
I am well prepared to teach the ESOL students in my classes.	25%	27%	48%	3%
When I have an ESOL student in my class, I regularly speak with the ESOL teacher at my school.	43%	20%	37%	33%
I have adequate training to work with ESOL students.	24%	16%	60%	13%
I would like to receive more professional development in teaching ESOL students.	74%	15%	11%	64%
I have the resources I need to successfully teach the ESOL students in my mathematics classroom.	23%	29%	48%	5%
	N ranged from 92 to 105.			N ranged from 12 to 41.

It appears that when teachers have what they need to teach ELLs, they have a more positive attitude toward ELLs in their classrooms. For example, I ran three correlations that were related to professional development and resources and found that "I welcome the inclusion of ESOL students in my class" significantly correlated with "I am well prepared to teach the ESOL students in my classes" ($r = .33$, $p < .01$, $N = 100$). In addition, how often a teacher spoke with the ESOL teacher positively correlated with the item "I welcome the inclusion of ESOL students in my class" ($r = .29$, $p < .05$, $N = 94$). However, there was not a significant correlation between the questionnaire items "I am not responsible for the mathematics achievement of students who have limited English proficiency" and "I have the resources I need to successfully teach the ESOL students in my mathematics classroom."

On the questionnaire, 39% of respondents who taught ELLs this year or last year reported they had received training in teaching ELLs. Seventy-four teachers responded to the question of approximately how many hours of training received dealing specifically with ELLs. The answers ranged from 0 to 150 with a mean of 13.43. Specifically, 82% of these respondents had received less than 20 hours of training.

Of the 43 teachers who reported that they did not teach ELLs this year or last year, 20% reported having received training in teaching ELLs. Twenty-one of these 43 teachers who did not report teaching any ELLs this year or last year responded to the question about how many hours of training they had received. The answers ranged from 0 to 180 hours of training with a mean of 9.67. Almost all (94%) had received less than 20 hours of training.

One questionnaire item read, “In order to better serve the educational and developmental needs of ESOL students in your classroom, which would you need to know more about?” The 100 respondents to this question responded with the following: the “tools” or instruments available to assess ESOL students’ needs (65%); appropriate instructional models or strategies for teaching content areas to ESOL students (82%); the history, culture and arts of the target cultures (28%); and the language(s) of the students I teach (45%). Respondents were able to check all that applied.

When teachers have ELLs in their class, 43% of them reported regularly speaking with the ESOL teacher (see Table 23). The data indicated speaking with the ESOL teacher was an effective resource for the mainstream teacher. For example, the questionnaire item, “I welcome the inclusion of ESOL students in my class” positively correlated with “When I have an ESOL student in my class, I regularly speak with the ESOL teacher at my school” ($r = .23$, $p < .05$, $N = 94$).

The data indicated teachers are in need of resources and training to better meet the needs of the ELLS in their classrooms. Only 24% of teachers thought they have adequate training to work with ELLs; additionally, only 23% reported having the resources they need to successfully teach ELLs in their classrooms (see Table 23). Fortunately, these teachers are willing to learn more about educating ELLs. Specifically, 74% answered that they would like to receive more professional development in teaching ELLs.

Having received training is significantly related to three of the teacher belief variables (see Table 24). Specifically, having received adequate training to work with ELLs was significantly related to feeling good about being able to help ELLs understand

Table 24

Correlations with Likert Item: I Have Adequate Training to Work with ESOL Students

Questionnaire Items Related to Teacher Strategies	Pearson Correlation
I am good at helping ESOL students understand the material in my classes.	.47**
I am well prepared to teach the ESOL students in my classes.	.64**
I can adapt my instruction so that even those students with limited English proficiency can master the material in mathematics.	.33**
The ESOL students in my class hinder the learning of the other students in the class. (reverse coded)	.11
I welcome the inclusion of ESOL students in my class.	.15
I am not responsible for the mathematics achievement of ESOL students. (reverse coded)	.16
If students can speak English fluently with their friends, they should be able to understand the mathematics content as well as other students.	-.07
All things considered, I would rather not have ESOL students in my classes (reverse coded).	.07
It is my responsibility to bring ESOL students up to the same level as other students mathematically.	-.08

Note. N ranged from 87 to 90.

** $p < .01$.

the mathematics material, feeling well prepared to teach ELLs, and being able to adapt instruction to meet the needs of ELLs.

Research question 4 qualitative analysis. When asked on the open-ended item about the challenges they face with ELLs, several teachers mentioned not having the proper resources and needing translators. For example, one teacher wrote on an open-ended item, "I need a Para or a co-teacher to help with differentiation of instruction." Similarly, a teacher I interviewed commented, "I don't have resources. If they had translators … something they could put the English word in like evaluate and it would mean this is their language and they can see the association and hear it." During another interview, a teacher suggested a phone translation service she had used in a previous job at a hospital. Another teacher I interviewed said, "I wish I had more help. More than a few of my 28 ESOL kids have fallen through the cracks because of class size, lack of time, and lack of knowledge."

A few teachers wrote specifically about textbooks. The following comments were made: (1) "Textbooks are just not well adapted to ESOL students," (2) "I do not have a text with Spanish support – this is to their disadvantage," and (3) "ESOL students would benefit most from a parallel language textbook." Similarly, many teachers reported that they would like more materials in the native language of their students, primarily Spanish. Challenges reported on the questionnaire included not have materials with Spanish directions or a glossary in the students' native language. One teacher brought it closer to home—"you can find books that have things written in Spanish and English, but *our* [italics added] standards need to be in 2 languages."

On the open-ended items and during the interviews, the teachers made a number of suggestions about how professional development would help them teach the ELLs in their classrooms. For example, five teachers on either the open-ended items or during an interview professed a desire to learn or become more proficient in Spanish. Table 25 lists the other comments the teachers made on open-ended items and during interviews about wanting professional development to help teach the ELLs in their classrooms.

The interviews with the teachers indicated that more collaboration and communication is needed between mainstream mathematics teachers and ESOL teachers. For example, four of the teachers interviewed suggested they need more help from the ESOL teacher. Specifically, one teacher commented, "I would like help from the ESOL teacher with the terminology, test taking skills, instructions on tests. I don't like that the international center does their job, the ESOL person does theirs, and we do ours. There is no collaboration there." Similarly, when asked what more the ESOL teacher could do to help her, another teacher said, "What can I do? What can I expect? Help me personally, know what the bar is. Modify tests, what's their culture, if I needed them to finish something, they could always do that with her."

The teacher interviews also suggested that the relationships between the mathematics teachers and ESOL teachers appear strained. For example, during the interviews, teachers made the following comments:

- I would LOVE to have help with grading the assessments. I watch the ESOL teacher be able to shut her notebook and go, and say see you tomorrow!

Table 25

Comments Made by Teachers to the Open-ended Questions and During Interviews about Wanting Professional Development

Teachers need intensive training on how to teach ESOL students all throughout the year. A one hour inservice at the beginning of the year is not sufficient.	It's the training, any types of methodology that would be useful. I absolutely want professional development.
I would like to have more professional development on teaching ESOL students.	I do not have the training or resources to do these students justice.
The ESOL students are missing out on a lot, and I think we need proper training.	I would say that after this many years, I still don't know how to modify.
And again maybe I can learn something different through some kind of training or something. I just don't know how to break that barrier right now.	It was useful when our ESOL teacher went to Mexico and saw the schools and brought that info back. It helps when I understand the culture, understand where they are coming from.

- The situation is me chasing her down, and her not telling me. I do collaborative (with special ed) and I know how that relationship works, and that relationship should be the same with the ESOL teacher. I feel like tell me something. I would like her to modify tests if she were able to. Let me know, this child has no chance of doing this right now, you know, this is what she can do, this is what she can't do. It's a guessing game.
- I think I have one (an ESOL student) in here now, see the thing of it is, when they come in, they don't let us know, we don't get anything on the kids once they come in, we have to as a teacher find out all that for ourselves. Our schedules are not the same. More communication would be helpful.

Two of the teachers I interviewed suggested that students need more ESOL instruction. For example, a teacher at a school who did not have a formal ESOL program commented, "I think each school should have at least one ESOL class." Another teacher I interviewed said, "I think some of them need more one-on-one structured instruction than one hour a day."

Research Question 5

What are the experiences of ELLs in middle school mathematics classrooms?

Despite the common assumption that mathematics is a relatively easy subject for ELLs, after talking with four students, I found the opposite to be true. Two of the students even said mathematics was their hardest subject to understand. When asked about the difficulties the students face in math class, they all made some reference to "the words." When asked to recall a time when something was easy in math and why, Diego, an eighth grade native Spanish speaker, said, "Because I understand the words."

The four students I interviewed agreed with the teachers I interviewed that reading, and more particularly writing, make mathematics difficult for them. When asked what they do not like about mathematics or what was hard for them, two students answered, "the writing," For example, one student said, "We have to write letters, like words, like three thousand," and another student said, "They write the numbers in words, and sometimes I cannot read the numbers." When I asked for some examples of how writing was difficult, one student said, "Find the volume, the area, the length, and y." Another student said "Mathematics with a lot of words" was hard, and another said, "word problems hard." These answers continue to point to language comprehension. When I asked one student to remember a time when he could not do something in math class and why, he said, "Because I didn't understand the words."

These students had different experiences with assessment in their mathematics classrooms. Trong, an eighth grader from Vietnam, recalled when he first came to the United States in sixth grade. He said he had a hard time understanding the teacher, so he did not really know what was going on. On the tests, the teacher gave him a "special test." He said, "If there were a lot of words, she just give me math problems." However, he told me he got A's because "if I make bad, she don't count it." Two other students reported going to their ESOL teacher for help with assessments. During the interviews**,** two out of the four students mentioned the CRCT being hard to understand and having a lot of word problems.

All of the students expressed a desire to have more materials in their native language. They also believed they learn best when working in groups or with a friend. The students also reported that it would be helpful to have extra time with assignments,

but they usually did not get it. Two students talked about how they were sometimes confused because their teacher worked out the problems differently than how they had learned the process in Mexico. Three of the students said there was not anyone at home who could help them with their math.

CHAPTER 5

SUMMARY AND RECOMMENDATIONS

"It's hard because math has a lot of words."

--Carlos, 6th grader from Mexico

This chapter presents a summary of the study, limitations, the summary of the findings, recommendations for middle school mathematics teachers, recommendations for professional development, recommendations for curriculum designers, and recommendations for future research.

Summary of Study

The purpose of this study was to explore the beliefs middle school mathematics teachers have about the ELLs in their classrooms and the factors influencing those beliefs. In addition, I wanted to identify the strategies these mathematics teachers use to help the ELLs in their classrooms. I also explored the support teachers need to teach the ELLs in their classrooms. Finally, I learned how four ELLs felt in their mainstream mathematics classrooms.

I designed the "Mathematics Teachers' Beliefs about English Language Learners Questionnaire," which was completed by 106 middle school mathematics teachers of ELLs. Additionally, I interviewed five teachers who provided their email address on the

questionnaire. Finally, I interviewed four ELLs about their experiences in middle school mathematics classrooms.

Limitations

Because of the nature of my research questions on beliefs, I will have to be cautious when making too broad of conclusions. A questionnaire cannot measure people's behaviors; it can only measure their perceptions of those behaviors or their willingness to discuss their behaviors (Sherblom, Sullivan, & Sherblom, 1993). By assuring confidentiality in my prenotification email, I hoped to minimize concerns about honesty. Unfortunately, according to Fowler (2002), there is no objective way of validating answers when people are asked about subjective states such as beliefs. Similarly, Bradburn, Sudman, and Wansink (2004) write that subjective states, such as beliefs, cannot be observed; they only exist in a person's mind.

Another potential limitation in this study is that teachers' self-reported beliefs may not indicate their actual behavior in the classroom. Garson (2007) calls this the attitude-action gap, in which he posits that attitudes are a poor predictor of behavior. According to Garson, even when they would like to, individuals may lack the resources, opportunity, or sense of efficacy to act.

Web-based questionnaires come with particular limitations. By far, the most important disadvantage to implementing a web-based questionnaire is coverage bias. In other words, not everyone is connected to the Internet, and not all respondents are computer literate (Archer, 2003; Dillman, 2000; Fowler, 2002; Solomon, 2001).

Respondents must have access, have the skills, and feel comfortable with web-based questionnaires in order to participate (Zhang, 1999). Fortunately, as certified teachers in Georgia, the participants were required to have technology training and used the Internet and email in their jobs.

Another drawback to be taken into consideration with web-based questionnaires is that participants could submit their responses many times (Zhang, 1999). However, the program I used, SurveyMonkey, has security measures in place to prevent repeat responders.

A further potential source of error arises when respondents are asked to remember events they may have forgotten. It is essential that respondents not be forced to report events that may have happened too long ago to be remembered accurately (Grusin & Stone, 1992; Scheuren, 2004). For example, Garson (2007) recommends not asking about events that happened over 6 months ago unless the reference is to major events. This potential error could exist in my data collection because I asked respondents to recall aspects of their classrooms and teaching that occurred in the current and previous year.

Finally, bias could exist in the data collected during the teacher interviews because the participants were volunteers. None of the teachers who included their email address to be contacted for an interview reported overtly negative comments on the questionnaire toward ELLs. However, some of these teachers still made negative comments about ELLs during the interviews.

Summary of Findings

The following summarizes the findings for each research question.

Research Question 1

What are the beliefs of middle school mathematics teachers about ELLs in mainstream classrooms?

The questionnaire data indicated many teachers are optimistic about teaching ELLs. For example, based on a Likert item questionnaire response, 86% of teachers welcome the inclusion of ELLs in their classrooms. Additionally, 92% trusted that ELLs can master the required curriculum when given proper support. Many teachers reported on the open-ended items that they believed that ELLs try very hard and are motivated to learn.

However, 54% of teachers indicated on another Likert item that they accepted as true that ELLs should not be included in regular education classes until they attain a minimum level of English proficiency. Teaching mathematics to ELLs is a concern for these questionnaire respondents; 88% felt that language is an issue in mathematics classrooms. Specifically, through open-ended item responses, the teachers reported that they believed ELLs have difficulties with the amount of reading, word problems, and specialized vocabulary, particularly in the Georgia Performance Standards curriculum. Teachers on the open-ended items also reported a lack of time as being a challenge to meeting the needs of ELLs. Additionally, the teachers I interviewed reported that ELLs do not have support from home when it comes to school work.

The questionnaire data indicated that teachers are not confident in their ability to teach ELLs. For example, only 53% of questionnaire respondents felt they were good at helping ELLs understand the material in their classes. Similarly, just 56% of these teachers believe they can adapt their instruction so that ELLs can understand the material presented.

Only 49% of teachers on the questionnaire disagreed with the item "Students should not use their native language at school" despite that many researchers (e.g., Cummins, 2000; Freeman, Freeman, & Mercuri, 2005) have found that knowledge of literacy in a first language can transfer easily and therefore facilitate second language learning. Similarly, 78% of teachers on the questionnaire accepted as true that speaking English at home will facilitate English language acquisition.

When asked if ELLs should be able to acquire English within 2 years of arriving in U.S. schools, the teachers' answers were divided; 33% agreed, 36% neither agreed nor disagreed, and 31% disagreed. Cummins (1981) found that 5 to 7 years was needed for ELLs to reach grade level in academic aspects of English.

Research Question 2

What factors influence these beliefs?

Two factors made a significant difference on teachers' beliefs. The most notable differences were between those who had received training in teaching ELLs and those who had not. Those who had training believed they were significantly more prepared to teach ELLs and felt they were good at helping ELLs understand the material in their classes significantly more than the teachers who had not received training. In addition,

females believed significantly more than males that teachers should modify assignments for ELLs.

On the other hand, there was no significant difference between the teachers who had received training and those who had not when it came to believing that speaking English at home will facilitate English language acquisition. These findings support those of Karabenick and Noda (2005) and Reeves (2004).

This study contradicts previous research that found teachers to have more positive attitudes about ELLs when they were proficient in another language (Lee & Oxelson, 2006; Shin & Krashen, 1996; Youngs & Youngs, 2001). This research is also in contrast to the findings of Youngs and Youngs (2001) that mainstream teachers who had lived abroad were more welcoming of ELLs in their classrooms.

Research Question 3

What strategies, if any, do teachers use to help ELLs succeed?

On the questionnaire, teachers reported using collaborative learning (81%) and differentiation (77%) to meet the needs of ELLs. This finding is in contrast to Harklau's (1999) observation that in mathematics classes in particular, teachers spent most of class lecturing on concepts from the course text and tended not to make adjustments in their speech to accommodate for ELLs. It is possible that the teachers reported on the questionnaire that they used these strategies, but if the teachers were observed, these strategies would not be apparent. Results from the questionnaire indicated 24% of teachers never modify or modify only a couple times a year for an ELL in their classroom. Teachers who had training in teaching ELLs used differentiation and modified assignments significantly more than those without training.

Research Question 4

What types of support are teachers receiving, and what additional support could they use to meet the needs of ELLs?

Only 24% of questionnaire respondents deemed they have adequate training to teach ELLs. Moreover, 74% of these teachers wanted more training in working with ELLs. Specifically, 82% responded on the questionnaire that they wanted to know more about instructional models or strategies used with ELLs in the content areas. Results from the questionnaire indicated that teachers with training believed they can adapt their instruction to meet the needs of ELLs significantly more than those without training.

In addition to the desire for more training, only 23% of the teachers reported they have the resources they feel they need to meet the needs of the ELLs in their classrooms. The qualitative data showed that teachers think more information about ELLs from the ESOL teacher would be helpful.

Research Question 5

What are the experiences of ELLs in middle school mathematics classrooms?

The students interviewed reported having difficulties in mathematics class because of the number of word problems and words they could not understand. These students wished they had more materials in their native language and more time to complete assignments. In addition, they felt they learn best when working in a group.

Recommendations for Middle School Mathematics Teachers

Several recommendations for mathematics teachers of ELLs are drawn from the results of this study. First, mainstream teachers need to claim each student in their classroom as their responsibility. As Yoon (2008) states, "Teaching ELLs is not a responsibility of only ESL teachers but also of classroom teachers. It is crucial to form a new concept of classroom teachers' roles to include ELLs' diverse needs and to take full responsibility for their needs" (p. 516). Likewise, teachers should not blame the difficulties of ELLs on their home lives. Every student comes into a classroom with different needs and each deserves an equal access to the curriculum.

Second, mainstream teachers and ESOL teachers need to work together to meet the needs of ELLs. Dillon (2001) states that ESOL and mainstream teachers need opportunities to collaborate. Similarly, Cahnmann and Remillard (2002) posit mathematics and bilingual-bicultural concerns are often at odds with each other. In the words of one teacher I interviewed, "One thing I like about mathematics is that mathematics is a link. You need to know one thing before going to the other thing. I think education is the same way. And I think our education working with these kids the link should be even tighter there, and that's *not* [italics added] happening." Moore (1999) believes collaboration must be practiced and discussed for mainstream teachers to be aware of the ESOL teacher's responsibilities versus their responsibilities in the classroom.

Finally, principals, school boards, and superintendents should support their school teachers as they implement these recommendations. If principals would make ELLs and

teacher collaboration a priority, then teachers would be apt to put more time and energy into these endeavors.

Recommendations for Professional Development

The qualitative and quantitative data on teacher resources and training suggest a need for increased professional development for the mathematics teachers of ELLs. The results clearly showed that these 106 teachers who teach ELLs did not believe they are prepared nor have enough training to meet the needs of these students. As the ESOL programs continue to move toward inclusion, this issue will increase in importance. The teachers in my study are eager to receive professional development in teaching ELLs. Specifically, teachers want training on instructional models and strategies to use with ELLs in mainstream classrooms. Results from the questionnaire indicate that the teachers need more knowledge in the principles of second language acquisition, as well as opportunities to communicate and better understand the home lives of ELLs. Having training appears to be effective in influencing teachers' beliefs in a positive way toward ELLs. As Valenzuela (1999) writes, as long as teachers are not educated on the needs of culturally marginal youth, schooling will continue to subtract resources from them. This recommendation must be supported at the county and school levels for any real change to take place.

Recommendations for Curriculum Designers

Teachers in this study reported wanting more effective resources, particularly in students' native languages and geared toward the state curriculum. The Principles and Standards for School Mathematics (National Council of Teachers of Mathematics [NCTM], 2000) included equity as the first principle for reform of mathematics education. According to NCTM, excellence in mathematics education requires "raising expectations for students' learning, developing effective methods of supporting the learning of mathematics by all students, and providing students and teachers with the resources they need" (p. 12). The present study shows that students and teachers need additional resources for optimum learning to occur for ELLs. Bilingual resources designed specifically for the Georgia Performance Standards would be beneficial. However, according to English (2007), "Simple translations cannot explain or build conceptual understanding" because often ELLs have not developed mathematical language in their native language (p. 7). Similarly, Cahnmann and Remillard (2002) found that bilingual dictionaries were not always helpful with the specialized vocabulary in mathematics. Therefore, English word problems on tests and in classroom materials, as well as directions need to be written with ELLs in mind. According to English (2007), assuming mathematics is a universal language is flawed. She argues, "In the mathematical register specialized meanings are attached to everyday words" (p. 4).

Recommendations for Future Research

This study was unique in that it examined the beliefs of middle school mathematics teachers about ELLs. The research related to mathematics teachers' beliefs about ELLs and middle school teachers' beliefs about ELLs is sparse. Additionally, it was the first to use the "Mathematics Teachers' Beliefs about English Language Learners Questionnaire." As such, this study presents many opportunities for further research. The following recommendations are presented for consideration.

First, further studies need to be conducted using this questionnaire or modifications of the instrument. It appears that the instrument adequately provided information relevant to mathematics' teachers' beliefs. Shortening the length of the questionnaire, or breaking it down into more than one instrument may encourage a larger response rate.

Second, there is a need to replicate this study to confirm or reject the conclusions made. This study was conducted in 11 school systems in one state in the southeast region of the United States. Future research across the country or in different school systems in the same state would provide additional support for the findings presented. Future research should examine school systems with ELL populations that vary in size and nationalities to see if the findings remain consistent.

Third, beyond replication of this study, there is a need to complete studies to further examine teachers' beliefs about ELLs. I was able to obtain a large amount of diverse data by using mixed method research. However, additional data could be gained by using a purely qualitative approach. For example, more detailed information about

ELLs' experiences would help to strengthen this body of research. Additionally, observational data is necessary to examine what is actually happening in the classrooms of ELLs. Researchers could also use longitudinal studies to investigate changes in teachers' beliefs over time. Similarly, it is important to examine how teachers' beliefs affect the ELLs in their classrooms. For example, how do teachers' beliefs about the English language proficiency of their students affect perception of their academic abilities?

Finally, future research should be conducted to uncover additional factors influencing teachers' beliefs. Only two factors (i.e., training received and gender) were identified through this study. It is important to know why teachers believe they way they do before attempting to change their beliefs.

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APPENDIX A:

QUESTIONNAIRE CONCEPTUAL FRAMEWORK

Categories	Question Wordings	Location on questionnaire
Factors Influencing Beliefs	School district, gender, teaching experience, class populations, travel experiences, lived abroad, languages spoken	Section A #s 1-11, and 13
Teachers' Beliefs		
Beliefs about the impact of having ESOL students in a mainstream mathematics classroom	increased workload, hinder others learning, should not be included until have minimum proficiency, welcome inclusion, rather not have, benefits all students, time	Section C #s 1-8 Section E #s 1, 2, 4, and 5
Beliefs about how languages are learned	acquire in 2 years, shouldn't use native language, if can speak with friends, speaking English at home	Section C #s 9, 10, 11, and 17
Beliefs about mathematics and English language learning	language not an issue in mathematics, children all over the world learn mathematics the same way	Section C, #s 12 and 13
Teacher efficacy (beliefs about how well they meet the needs of ELLs)	I am well prepared, can adapt material, good at helping understand, I have control	Section C #s 14, 15, and 16 Section D #s 12, 13, and 14

Strategies		
Teacher collaboration	ESOL teacher collaboration	Section D #1
Assessment	given additional time, reading quizzes and tests aloud, grading on effort, cannot read	Section D #s 3, 4, 5, and 6
Classroom Practices	modify assignments, shortened assignments	Section A #12 Section D #s 2, 7, 8, 9, 10, and 11 Section E #3
Teacher Support		
Professional Development	Training received, what they need to know more about, would like more professional development	Section B #s 1-4, Section D #s 15 and 16
Resources	I have resources I need	Section D #17

APPENDIX B:

MATHEMATICS TEACHERS' BELIEFS ABOUT ENGLISH LANGUAGE LEARNERS QUESTIONNAIRE

1.

The purpose of this questionnaire to is explore the beliefs middle school mathematics teachers in Georgia have about the ESOL students in their classrooms. In addition, I would like to know what support, including professional development, teachers need in the area of teaching English language learners. Your input is an important contribution to the dialog about what ESOL students and their teachers need to be successful.

Section A. Please tell me a little about your background and teaching experience.

1. In what school district do you teach?

2. Are you:

◯ male ◯ female

3. Do you speak another language other than English?

◯ yes ◯ no

4. If yes, what language(s)?

5. If yes, what level of proficiency have you attained in your strongest additional language?

◯ beginning ◯ intermediate ◯ advanced

6. How many times have you traveled to a non-English speaking country in your lifetime?

◯ 0 times
◯ 1 time
◯ 2 times
◯ 3-5 times
◯ 6 or more times

7. Have you ever lived in a non-English speaking country for more than a month?

◯ yes ◯ no

8. If so, how long did you live there?

◯ 1 month - 6 months
◯ more than 6 months - 1 year
◯ more than 1 year - 3 years
◯ 3 - 5 years
◯ more than 5 years

9. Prior to this year, how many years have you completed as a school teacher?

◯ 0 years
◯ 1 year
◯ 2-5 years
◯ 6-10 years
◯ 11-15 years
◯ 16 or more years

10. This year, to how many total students do you teach mathematics?

11. This year, approximately how many total students who receive ESOL services are in your mathematics classes?
(If you do not teach any this year, but you did last year, you may use that number.)
(If you don't know, you may skip the question.)

12. When you have an ESOL student in your class, how often do you modify assignments for an ESOL student?

- ◯ never
- ◯ a couple times a year
- ◯ about once a month
- ◯ about once a week
- ◯ almost everyday or everyday

13. How is the English for Speakers of Other Languages (ESOL) program at your school structured? (check all that apply)

- ☐ students are pulled out once a day
- ☐ students are pulled out once a week
- ☐ students are pulled out for multiple subjects
- ☐ Inclusion
- ☐ I don't know

Other (please specify)

2.

Section B. Please tell me a little about the professional development you have received in the area of ESOL

1. Have you received any training in the area of teaching ESOL/English-language learners?

◯ yes ◯ no

2. If yes, what was the nature of this training?

☐ university course as an undergraduate
☐ university course as a graduate student
☐ professional development through your county
☐ professional development through your school

Other (please specify)

3. Approximately how many hours of training have you received dealing specifically with ESOL students? (Please enter your answer as a numeral, not using letters.)

4. In order to better serve the educational and developmental needs of ESOL students in your classroom, which would you need to know more about: (check all that apply)

☐ The "tools" or instruments available to assess ESOL students' needs
☐ Appropriate instructional models or strategies for teaching content areas to ESOL students in my classroom
☐ The history, culture and arts of the target cultures
☐ The language(s) of the students I teach

Other (please specify)

5. Section C. Now I'd like for you to tell me a little about the beliefs you hold concerning ESOL students in your mathematics classroom.

Please read each statement and circle the number that best describes your opinion. If the statement does not apply to your situation, please mark N/A for not applicable.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	N/A Not applicable
I welcome the inclusion of ESOL students in my class.	◯	◯	◯	◯	◯	◯
The inclusion of ESOL students in regular education classes benefits all students.	◯	◯	◯	◯	◯	◯
ESOL students should not be included in regular education classes until they attain a minimum level of English proficiency.	◯	◯	◯	◯	◯	◯
The inclusion of ESOL students in my classes increases my workload.	◯	◯	◯	◯	◯	◯
The ESOL students in my class hinder the learning of the other students in the class.	◯	◯	◯	◯	◯	◯
It is difficult for mainstream teachers to find enough time to deal with the needs of ESOL students.	◯	◯	◯	◯	◯	◯
All things considered, I would rather not have ESOL students in my classes.	◯	◯	◯	◯	◯	◯
When given proper support, I believe ESOL students can master the required curriculum.	◯	◯	◯	◯	◯	◯
ESOL students should not use their native language at school.	◯	◯	◯	◯	◯	◯

3.

1. Please read each statement and circle the number that best describes your opinion. If the statement does not apply to your situation, please mark N/A for not applicable.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	N/A Not applicable
If students can speak English fluently with their friends, they should be able to understand the mathematics content as well as other students.	◯	◯	◯	◯	◯	◯
ESOL students should be able to acquire English within two years of enrolling in U.S. schools.	◯	◯	◯	◯	◯	◯
Language is not an issue in the mathematics classroom.	◯	◯	◯	◯	◯	◯
Children all over the world learn mathematics the same way.	◯	◯	◯	◯	◯	◯
I am well prepared to teach the ESOL students in my classes.	◯	◯	◯	◯	◯	◯
I can adapt my instruction so that even those students with limited English proficiency can master the material in mathematics.	◯	◯	◯	◯	◯	◯
I am good at helping ESOL students understand the material in my classes.	◯	◯	◯	◯	◯	◯
Speaking English at home will facilitate English acquisition for ESOL students.	◯	◯	◯	◯	◯	◯

4.

1. Section D. Now I'd like for you to tell me a little about the strategies you use with ESOL students and the support you are receiving or still need in this area.

Please read each statement and circle the number that best describes your opinion. If the statement does not apply to your situation, please mark N/A for not applicable.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	N/A Not applicable
When I have an ESOL student in my class, I regularly speak with the ESOL teacher at my school.	◯	◯	◯	◯	◯	◯
It is unfair to make classwork modifications for ESOL students.	◯	◯	◯	◯	◯	◯
It is good practice to allow ESOL students additional time to complete coursework and assignments.	◯	◯	◯	◯	◯	◯
When helpful, it is good practice to read quizzes and tests aloud to ESOL students.	◯	◯	◯	◯	◯	◯
Teachers should not give ESOL students a failing grade if the students show effort.	◯	◯	◯	◯	◯	◯
ESOL students should not be graded on work that they cannot read.	◯	◯	◯	◯	◯	◯
Teachers should modify assignments for ESOL students in regular education classes.	◯	◯	◯	◯	◯	◯
ESOL students can show understanding on a few mathematics exercises, rather than be given the whole assignment.	◯	◯	◯	◯	◯	◯

5.

1. Please read each statement and circle the number that best describes your opinion. If the statement does not apply to your situation, please mark N/A for not applicable.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	N/A Not applicable
ESOL students are best taught using direct instruction/lecture to the entire class.	◯	◯	◯	◯	◯	◯
I use collaborative learning as a strategy to teach my ESOL students.	◯	◯	◯	◯	◯	◯
I use differentiation to meet the needs of the ESOL students in my classes.	◯	◯	◯	◯	◯	◯
I am not responsible for the mathematics achievement of students who have limited English proficiency.	◯	◯	◯	◯	◯	◯
It is my responsibility to bring ESOL students up to the same level as other students mathematically.	◯	◯	◯	◯	◯	◯
I have great control over the mathematical success of ESOL students in my class.	◯	◯	◯	◯	◯	◯
I have adequate training to work with ESOL students.	◯	◯	◯	◯	◯	◯
I would like to receive more professional development in teaching ESOL students.	◯	◯	◯	◯	◯	◯
I have the resources I need to successfully teach the ESOL students in my mathematics classroom.	◯	◯	◯	◯	◯	◯

6.

Section E. Please share your experiences with ESOL students in your classes and any suggestions you may have. Feel free to comment on topics not mentioned in the questionnaire.

1. What are some of the challenges you face with the ESOL students in your classes?

2. What do you like about teaching ESOL students in your mathematics classroom?

3. Please describe any strategies you use to help ESOL students in your classes.

4. In what ways do you feel the ESOL students in your classroom do or do not have an equal opportunity to learn the material in your mathematics class?

5. Please write any additional comments you have about this questionnaire or about the inclusion of ESOL students in mainstream mathematics classrooms.

6. If you are willing to be interviewed, please include your email address here, and I will contact you. Thank you for your help.

Your responses will remain confidential even if you agree to be interviewed.

APPENDIX C:

ITEMS BORROWED FROM OTHER QUESTIONNAIRES

Reeves, J. (2006).	Karabenick, S.A., & Noda, P.A.C. (2005).
The inclusion of ESOL students in regular education classes benefits all students.	In order to better serve the educational and developmental needs of ESOL students in my classroom, I would need to know more about:
The inclusion of ESOL students in my classes increases my workload.	All things considered, I would rather not have ESOL students in my classes.
I have adequate training to work with ESOL students.	I can adapt my instruction so that even those students with limited English proficiency can master the material.
ESOL students should avoid using their native language while at school.	I am good at helping ESOL students understand the material in my classes.
ESOL students should be able to acquire English within two years of enrolling in U.S. schools.	
It is good practice to allow ESOL students additional time to complete coursework and assignments.	
Teachers should not give ESOL students a failing grade if the students show effort.	
Teachers should modify assignments for ESOL students in regular education classes.	
ESOL students should not be included in regular education classes until they attain a minimum level of English proficiency.	
I welcome the inclusion of ESOL students in my class.	
It is difficult for mainstream teachers to find enough time to deal with the needs of ESOL students.	

APPENDIX D:

EMAIL USED FOR FOCUS GROUP RECRUITMENT

Dear Middle School mathematics teacher:

I will be placing a consent form letter in your mailbox concerning a study I'd like for you to participate in to help me with my PhD research. If at all possible, please try to attend this meeting after school on _____ at _____ in room 102. Depending on the number of teachers who participate, I will either hold a drawing or give each participant a $15 restaurant gift certificate. Again, the details are included on the form in your box, and feel free to contact me with any questions you may have.

Sincerely,

Stacie Pettit

APPENDIX E:

FOCUS GROUP RESEARCH CONSENT FORM

I agree to participate in the research titled "Middle School Mathematics Teachers' Beliefs about English Language Learners," which is being conducted by Stacie K. Pettit, Department of Elementary and Social Studies Education, University of Georgia, (706)294-9136, under the direction of Dr. Denise Glynn, Department of Elementary and Social Studies Education, University of Georgia, (706) 542-4244. Participation is voluntary. I can refuse to participate and can withdraw from participation without any penalty or any loss of benefits to which I am otherwise entitled. I can request to have the results of the participation, to the extent that it can be identified as my own, removed from the research records or destroyed.

The purpose of this study is to gain insight from middle school mathematics teachers on the development of a questionnaire that will be used in my dissertation study. The purpose of the dissertation study is to explore the beliefs of middle school mathematics teachers in Georgia toward English to Speakers of Other Languages (ESOL) students. The topic of ESOL students in mainstream classrooms has grown in importance since the passage of the No Child Left Behind Act (2001). Teachers can no longer expect that because a student is ESOL, his or her test scores will not count in grading the school. Instead, schools will be graded on the percentage of ESOL students that do meet the proficiency level. The ESOL teacher alone cannot prepare all of these students in every subject area without the help of mainstream teachers, and the beliefs of these mainstream teachers will influence the students' performances.

The dissertation study is guided by the following questions: What are the beliefs of middle school mathematics teachers regarding ESOL students? What factors influence these beliefs? What strategies, if any, do teachers use to help English language learners succeed? What types of support are teachers receiving and what more could they use to meet the needs of ESOL students?

The benefits that I may expect from participation are the opportunity to hear what strategies other mathematics teachers are using with ESOL students in their classrooms and the time to reflect on my own beliefs towards ESOL students.

If I volunteer to take part in this study, I will be asked to attend a one hour session after school at 3:00 in room 102. I will initially complete a questionnaire designed by the researcher that should take approximately 20 minutes. Then, I will stay to participate in a focus group during which the researchers will ask my opinion about and understandings of the questionnaire. This should take about 40 minutes. During the focus group, the researcher will take notes, which I will have the opportunity to review.

I understand that no discomforts, risks, or stresses are foreseen.

For the focus group portion, the researcher cannot guarantee that all participants will keep the discussions private; however, she will make every attempt to keep my identity confidential. She will not reveal any identifying information about me, or provided by me during the research, unless required by law. The researcher will keep any data containing individually identifying information in a locked filing cabinet. After analysis is complete, she will erase any individually identifying information from the data and will remove any links between my name and results.

Any information the researcher obtains about me as a participant in this study will be anonymous. I will not be asked to write my name on the questionnaire. My name will not be attached to any comments I make during the focus group. No one, other than the researcher, will have access to the data collected. The focus group notes will be destroyed upon successful defense of the dissertation. My identity will not be revealed in any publication of the results of this research. The results of this participation will not be released in any individually identifiable form without my prior consent unless otherwise required by law.

The researcher will answer any further questions about the research, now or during the course of the project, and can be reached by telephone at: 706-294-9136.

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

Please sign both copies of this form. Keep one, and return the other to the investigator.

_____	_____	_____
Name of Researcher	Signature of Researcher	Date

Telephone: _____

Email: _____

_____	_____	_____
Name of Participant	Signature of Participant	Date

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; Email Address IRB@uga.edu.

APPENDIX F:

FOCUS GROUP INTERVIEW PROTOCOL

Which questions did you find confusing?

Which questions did you find redundant or unnecessary?

Are there other important things on the topic you would have liked to say, but were not given the opportunity?

What else should I have asked?

How did you feel about the length of the questionnaire?

Did the questionnaire take too long to complete?

Going through each section of the questionnaire, I will ask:

What do you think this question is asking?

How did you answer the question?

Why did you choose one particular answer over another?

APPENDIX G:

EMAIL REQUESTING STUDENT INTERVIEW RECOMMENDATIONS

Dear Georgia educator,

My name is Stacie Pettit. I am a doctoral student at the University of Georgia. I am conducting a research study entitled, "Middle School Mathematics Teachers' Beliefs about English Language Learners," to fulfill requirements for my dissertation research. This data will guide future studies and hopefully increase the support and resources you receive to teach English to Speakers of Other Languages (ESOL) students. This research has been approved for your school system. I will be happy to email you the permission letter at your request.

I could use your help finding and recruiting ESOL students to interview. The interviews will last approximately 30-45 minutes and will be conducted at school. I am looking for students who were not proficient in English when they first came to the United States, but now have enough of a vocabulary to be interviewed in English. I am interested in talking with them about their middle school experiences when they were new to the country. *I would like to interview two students at a time to increase their comfort level and the possibility of discussion.* If you know of two students who fit these criteria, please email me their names and native languages. If you are willing to be used as a contact, I will email you the parental consent and minor assent forms to give to the students. They are available in English and Spanish.

Thank you so much for your time. Your recommendations are greatly appreciated. Feel free to contact me with any questions.

Sincerely,

Stacie Pettit

stacie.pettit@gmail.com

(662)307-2865

(706)294-9136 (cell)

APPENDIX H:

MINOR ASSENT FORM

Dear Participant,

You are invited to participate in my research project titled, "Middle School Mathematics Teachers' Beliefs about English Language Learners." Through this project I am learning about the experiences English language learners have in math classrooms and teachers' beliefs about these students in mainstream classrooms.

If you decide to be part of this, you will allow me to meet with you to talk and ask you some questions about being an English language learner in your middle school math classes. We will meet just one time for 30 minutes to an hour, and I will audiotape the interview. I hope to learn something that will help English language learners in the future.

If you want to stop participating in this project, you are free to do so at any time. You can also choose not to answer questions that you don't want to answer.

If you have any questions or concerns you can always ask me or call my teacher, Dr. Denise Glynn at the following number: (706) 542-4244.

Sincerely,

Stacie K. Pettit
University of Georgia
Elementary and Social Studies Education Department
(706) 294-9136

I understand the project described above. My questions have been answered and I agree to participate in this project. I have received a copy of this form.

_____
Signature of the Participant/Date

Please sign both copies, keep one and return one to the researcher at the time of the interview.

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; Email Address IRB@uga.edu

APPENDIX I:

PARENTAL CONSENT FORM

I agree to allow my child, _____, to take part in a research study titled, "Middle School Mathematics Teachers' Beliefs About English Language Learners" which is being conducted by Stacie K. Pettit, from the Elementary and Social Studies Education Department at the University of Georgia (706-294-9136) under the direction of Dr. Denise Glynn, Elementary and Social Studies Education (706-542-4244). I do not have to allow my child to be in this study if I do not want to. My child can refuse to participate or stop taking part at any time without giving any reason, and without penalty or loss of benefits to which my child is otherwise entitled. I can ask to have the information related to my child returned to me, removed from the research records, or destroyed.

- The reason for the study is to find out the difficulties English language learners have in math classes and teachers' beliefs about these students in mainstream classes.

- The researcher hopes to learn something that may help English language learners in the future.

- If I allow my child to take part, my child will be asked to be interviewed by the researcher one time for about 30 minutes to an hour. My child will be asked questions about his or her experiences in middle school math classrooms. The interview will be audiotaped.

- The research is not expected to cause any harm or discomfort. My child can quit at any time.

- Any individually-identifiable information collected about my child will be held confidential unless otherwise required by law. My child's identity will be coded, and all data will be kept in a secured location.

- The researcher will answer any questions about the research, now or during the course of the project, and can be reached by telephone at: 706-294-9136. I may also contact the professor supervising the research, Dr. Denise Glynn, Elementary and Social Studies Education Department, at 542-4244.

- I understand the study procedures described above. My questions have been answered to my satisfaction, and I agree to allow my child to take part in this study. I have been given a copy of this form to keep.

_____ _____ _____

Name of Researcher Signature Date

Telephone: _____
Email: _____

_____	_____	_____
Name of Parent or Guardian	Signature	Date

Please sign both copies, keep one and return one to the researcher.

Additional questions or problems regarding your child's rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; Email Address IRB@uga.edu

APPENDIX J:

MINOR ASSENT AND PARENTAL CONSENT FORMS IN SPANISH

Estimado Participante,

Usted esta invitado a tomar parte en mi proyecto de investigación titulado, "Maestros de Matemáticas de Escuela y sus Creencias Acerca de Estudiantes Aprendiendo Ingles." Por medio de este proyecto quiero aprender acerca de las experiencias que estudiantes aprendiendo ingles tienen en clases de matemáticas, y las creencias de maestros acerca de estos estudiantes en clases convencionales.

Si usted decide ser parte de este proyecto, me gustaría reunirme con usted para hablar y hacerle preguntas acerca de estos estudiantes en sus clases de matemáticas mencionado arriba. Sólo necesito reunirme una vez para aproximadamente treinta minutos a una hora, y yo cinta de audio la entrevista. Espero aprender algo que ayudará a estudiantes aprendiendo ingles en el futuro.

Si usted quiere parar participación en este proyecto, lo puedes hacer en cualquier momento sin razón. Adicionalmente, también puedes escoger las preguntas que usted desea contestar.

La investigadora contestará cualquier pregunta acerca de la investigación, ahora o durante el proyecto, y puede ser alcanzado por teléfono: 706-294-9136. También puedes contactar a la profesora que supervisa la investigación, Dr. Denise Glynn, (706) 542-4244.

Sinceramente,

Stacie K. Pettit
Universidad de Georgia
Elementary and Social Studies Education Department
(706) 294-9136

_____ _____
Firma de Participante Fecha

Por favor firma ambas copias, mantenga uno y devuelva uno a la investigadora.

Preguntas o problemas adicionales con respecto a tus derechos como participante en este estudio deben ser dirigido a El Presidente, del Consejo de Revisión, la Universidad de Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Teléfono (706) 542-3199; MANDE CORREO ELECTRONICO la Dirección IRB@uga.edu

Concuerdo en permitir mi niño _____, tomar parte en un estudio de investigación con tituló de "Maestros de Matemáticas de Colegio y sus Creencias Acerca de Estudiantes Aprendiendo Inglés." El estudio es realizado por la Señora Stacie K. Pettit, del Departamento de la Educación de Escuela Primaria y Estudios Sociales en la Universidad de Georgia (706-294-9136), bajo la dirección de Dr. Denise Glynn (706-542-4244). Yo entiendo que no tengo que permitir a mi niño tomar parte en este estudio si yo no quiero. Mi niño puede decidir no participar en este estudio, o dejar de participar en cualquier momento durante el estudio sin razón ni consecuencias o la pérdida de beneficios a que mi niño de otro modo es permitido. También puedo pedir que la información relacionada a mi niño sea entregada a mí, a parte de los registros de investigación, o destruida.

• Esta investigación sirve para averiguar qué dificultades tienen los estudiantes aprendiendo inglés en la clase de matemáticas, y qué opinan los maestros sobre estos estudiantes en clases convencionales.
• La investigadora espera aprender algo que puede ayudar a estudiantes aprendiendo inglés en el futuro.
• Si permito que mi niño participe, la investigadora tendrá una entrevista con mi niño una vez por aproximadamente 30 minutos o una hora. Mi niño será preguntado sobre sus experiencias en la clase de matemáticas en la escuela. La entrevista será audiotaped
• No esperamos que la investigación causara ningún daño ni incomodidad. Mi niño puede parar la entrevista cuando quiera.
• Información privada acerca de mi niño será guardado confidencialmente, a menos eso que la ley requiere. La identidad del niño será codificada, y todos datos serán mantenidos en un lugar asegurado.
• La investigadora puede contestar cualquier pregunta sobre este proyecto, ahora o durante el proyecto, y puede ser llamada por teléfono: (706) 294-9136. También se puede llamar a la profesora que supervisa la investigación, Dr. Denise Glynn: (706) 542-4244.
• Entiendo los procedimientos describidos arriba. Mis preguntas han sido contestadas a mi satisfacción, y yo estoy de acuerdo y permito mi niño tomar parte en este estudio. He recibido una copia de esta forma para guardar.

_____	_____	_____
Nombre de Investigadora	Firma	Fecha

Teléfono: _____
Dirección de correo electrónico:_____

_____	_____	_____
Nombre de Padre/Guardián	Firma	Fecha

Por favor firmar las dos copias, mantenga uno y devuelva uno a la investigadora.

Preguntas o problemas adicionales con respecto a los derechos de su niño como participante en este estudio deben ser dirigido a El Presidente del Consejo de Revisión, la Universidad de Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Teléfono (706) 542-3199; CORREO ELECTRONICO: IRB@uga.edu

APPENDIX K:

STUDENT INTERVIEW PROTOCOL

1. What do you or have you liked about your middle school math classes?
2. What haven't you liked about your middle school math classes?
3. What are some things your teacher(s) have done to help you understand the math better?
4. What have you had difficulty with in your middle school math classes?
5. What do you wish your teacher(s) would do to help you understand things better in math class?
6. Do you ever have difficulty understanding the language (the English) in math class?
7. What do you feel students learning English (like yourself) would have a hard time with in math classes?
8. Do you feel welcome to speak out during discussions in math class?
9. Do you ever speak your native language while in math class? How does your teacher feel about this?
10. Do you feel your teacher treats you the same as the non-English language learners? In what ways?

APPENDIX L:

TEACHER INTERVIEW PROTOCOL

1. Tell me about your experiences with ESOL students in your classroom.
2. Have the demographics changed over the last ten years in your school in regards to the ESOL population?
3. What types of strategies, if any, do regular education teachers use to help students in their classes who are not yet proficient in English?
4. What do you feel the role of the ESOL teacher is in helping regular education teachers with these students?
5. In what ways do you feel students do or do not have the resources they need to succeed in classrooms other than their ESOL classroom?
6. What resources are available in Spanish or any other languages, and do you think teachers find it less difficult to teach Spanish speaking children because of these resources?
7. Describe any experiences you have had with multiple English language learners in one class.
8. Did this seem to make teaching easier or more difficult? In what ways?
9. How do you feel the ESOL students in your class help or hinder the learning of the other students in the class?
10. What other services or programs do you feel like your school could set up to support these students?
11. Do you think it is easier for ESOL students to succeed in any particular subject than another? In what ways?

12. Are there any structures set up at your school for translations during conference days?
13. Are there translations of any paperwork that goes home with these students?
14. Have you witnessed any attempts on scheduling to be made based on the teachers who want the ESOL kids, or grouping them together or separately?
15. What do you think are some of the causes of frustration of teachers in teaching English language learners?
16. Is there collaboration among the faculty or sharing of ideas that could help with these frustrations?
17. Is there a lot of professional reading and research sharing among faculty? Do you feel like you are informed about best practices?
18. What are some changes you feel could be put into effect to improve the learning of ESOL students in math?

Thank you very much for your time. Is there anything else in relation to these questions you would like to tell me? Do you have any questions for me?

APPENDIX M:

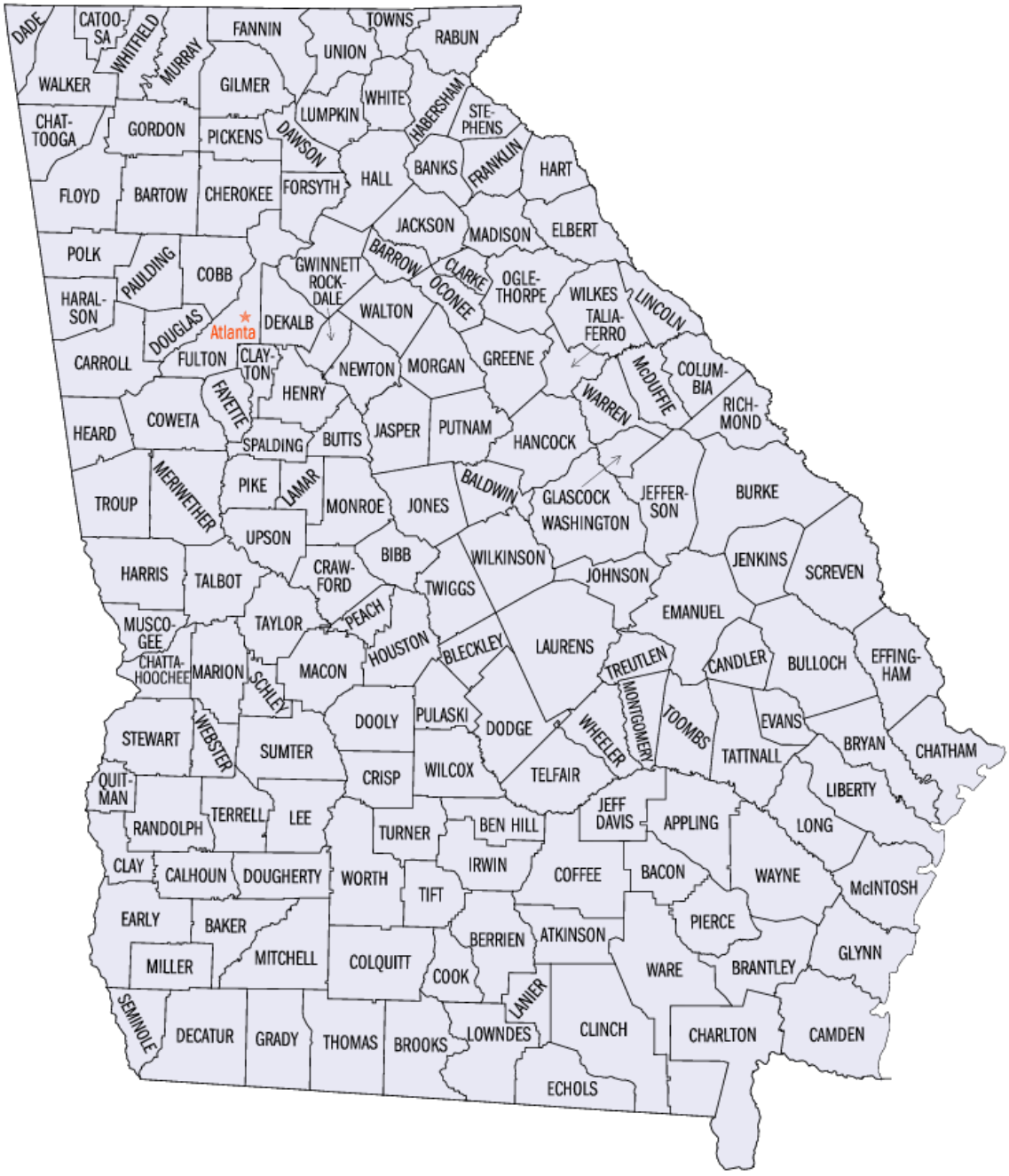
STUDENT NUMBERS IN GEORGIA SCHOOL SYSTEMS

System Name	# Students
Appling County	3,383
Atkinson County	1,676
Bacon County	1,866
Baker County	387
Baldwin County	5,950
Banks County	2,539
Barrow County	10,194
Bartow County	13,800
Ben Hill County	3,320
Berrien County	3,043
Bibb County	24,806
Bleckley County	2,440
Brantley County	3,359
Brooks County	2,392
Bryan County	6,013
Bulloch County	8,643
Burke County	4,525
Butts County	3,386
Calhoun County	723
Camden County	9,569
Candler County	1,901
Carroll County	14,164
Catoosa County	10,230
Charlton County	1,959
Chatham County	**33,672**
Chattahoochee County	551
Chattooga County	2,990
Cherokee County	31,073
Clarke County	11,534
Clay County	367
Clayton County	50,972
Clinch County	1,412
Cobb County	103,447
Coffee County	7,939
Colquitt County	8,393
Columbia County	**20,554**
Cook County	3,240
Coweta County	19,783
Crawford County	2,035
Crisp County	**4,288**
Dade County	2,583
Dawson County	3,100
Decatur County	**5,716**
DeKalb County	**99,033**
Dodge County	3,521
Dooly County	1,502
Dougherty County	16,724
Douglas County	21,268
Early County	2,608
Echols County	704
Effingham County	9,849
Elbert County	3,600
Emanuel County	4,482
Evans County	1,901
Fannin County	3,177
Fayette County	21,716
Floyd County	10,407
Forsyth County	23,730
Franklin County	3,796
Fulton County	76,111
Gilmer County	**4,022**
Glascock County	595
Glynn County	11,903
Gordon County	6,345
Grady County	4,442
Greene County	2,224
Gwinnett County	135,822
Habersham County	**6,197**
Hall County	**23,150**
Hancock County	1,522
Haralson County	3,748
Harris County	4,489
Hart County	3,522
Heard County	2,145
Henry County	32,586
Houston County	23,931
Irwin County	1,763
Jackson County	6,035
Jasper County	2,038
Jeff Davis County	2,680
Jefferson County	3,278
Jenkins County	1,706
Johnson County	1,256
Jones County	5,144
Lamar County	2,531
Lanier County	1,585

Laurens County	6,237
Lee County	5,585
Liberty County	11,001
Lincoln County	1,382
Long County	2,099
Lowndes County	9,217
Lumpkin County	3,604
Macon County	2,119
Madison County	4,602
Marion County	1,654
McDuffie County	4,159
McIntosh County	1,877
Meriwether County	3,848
Miller County	1,136
Mitchell County	**2,798**
Monroe County	3,804
Montgomery County	1,242
Morgan County	3,202
Murray County	7,558
Muscogee County	32,467
Newton County	15,967
Oconee County	5,790
Oglethorpe County	2,327
Paulding County	21,905
Peach County	4,052
Pickens County	4,130
Pierce County	3,335
Pike County	2,999
Polk County	7,005
Pulaski County	1,664
Putnam County	2,605
Quitman County	302
Rabun County	2,250
Randolph County	1,579
Richmond County	**33,544**
Rockdale County	14,598
Schley County	1,223
Screven County	2,974
Seminole County	1,741
Spalding County	10,551
Stephens County	4,285
Stewart County	702
Sumter County	5,580
Talbot County	774
Taliaferro County	272
Tattnall County	3,352
Taylor County	1,556
Telfair County	1,697
Terrell County	1,636
Thomas County	5,591
Thomaston-Upson County	4,962
Tift County	7,519
Toombs County	2,818
Towns County	1,853
Treutlen County	1,223
Troup County	11,943
Turner County	1,857
Twiggs County	1,355
Union County	2,580
Walker County	8,860
Walton County	11,208
Ware County	6,276
Warren County	875
Washington County	3,615
Wayne County	5,345
Webster County	405
Wheeler County	1,081
White County	3,823
Whitfield County	12,486
Wilcox County	1,434
Wilkes County	1,801
Wilkinson County	1,664
Worth County	4,061

APPENDIX N:

MAP OF GEORGIA COUNTIES



APPENDIX O:

ESOL PERCENTAGES BY COUNTY

System Name	# ESOL	% ESOL
Appling County	57	1.68%
Atkinson County	78	4.65%
Bacon County	14	0.75%
Baker County	0	0.00%
Baldwin County	43	0.72%
Banks County	54	2.13%
Barrow County	425	4.17%
Bartow County	295	2.14%
Ben Hill County	99	2.98%
Berrien County	0	0.00%
Bibb County	202	0.81%
Bleckley County	0	0.00%
Brantley County	0	0.00%
Brooks County	45	1.88%
Bryan County	0	0.00%
Bulloch County	86	1.00%
Burke County	0	0.00%
Butts County	0	0.00%
Calhoun County	0	0.00%
Camden County	39	0.41%
Candler County	115	6.05%
Carroll County	81	0.57%
Catoosa County	41	0.40%
Charlton County	0	0.00%
Chatham County	**207**	**0.61%**
Chattahoochee County	0	0.00%
Chattooga County	40	1.34%
Cherokee County	861	2.77%
Clarke County	669	5.80%
Clay County	0	0.00%
Clayton County	2218	4.35%
Clinch County	0	0.00%
Cobb County	4491	4.34%
Coffee County	179	2.25%
Colquitt County	322	3.84%
Columbia County	**88**	**0.43%**
Cook County	55	1.70%
Coweta County	248	1.25%
Crawford County	0	0.00%
Crisp County	**26**	**0.61%**
Dade County	4	0.15%
Dawson County	43	1.39%
Decatur County	**45**	**0.79%**
DeKalb County	**3819**	**3.86%**
Dodge County	7	0.20%
Dooly County	39	2.60%
Dougherty County	29	0.17%
Douglas County	344	1.62%
Early County	0	0.00%
Echols County	45	6.39%
Effingham County	31	0.31%
Elbert County	61	1.69%
Emanuel County	40	0.89%
Evans County	50	2.63%
Fannin County	0	0.00%
Fayette County	309	1.42%
Floyd County	157	1.51%
Forsyth County	822	3.46%
Franklin County	59	1.55%
Fulton County	3108	4.08%
Gilmer County	**313**	**7.78%**
Glascock County	0	0.00%
Glynn County	181	1.52%
Gordon County	218	3.44%
Grady County	97	2.18%
Greene County	35	1.57%
Gwinnett County	10924	8.04%
Habersham County	**359**	**5.79%**
Hall County	**2417**	**10.44%**
Hancock County	0	0.00%
Haralson County	0	0.00%
Harris County	0	0.00%
Hart County	36	1.02%
Heard County	0	0.00%
Henry County	276	0.85%
Houston County	234	0.98%
Irwin County	0	0.00%
Jackson County	116	1.92%
Jasper County	46	2.26%
Jeff Davis County	92	3.43%
Jefferson County	19	0.58%
Jenkins County	10	0.59%
Johnson County	0	0.00%
Jones County	0	0.00%
Lamar County	0	0.00%
Lanier County	3	0.19%
Laurens County	25	0.40%
Lee County	0	0.00%
Liberty County	60	0.55%

Lincoln County	0	0.00%	Spalding County	81	0.77%
Long County	42	2.00%	Stephens County	22	0.51%
Lowndes County	96	1.04%	Stewart County	0	0.00%
Lumpkin County	106	2.94%	Sumter County	41	0.73%
Macon County	26	1.23%	Talbot County	0	0.00%
Madison County	37	0.80%	Taliaferro County	0	0.00%
Marion County	0	0.00%	Tattnall County	97	2.89%
McDuffie County	15	0.36%	Taylor County	0	0.00%
McIntosh County	0	0.00%	Telfair County	26	1.53%
Meriwether County	0	0.00%	Terrell County	0	0.00%
Miller County	0	0.00%	Thomas County	4	0.07%
Mitchell County	**41**	**1.47%**	Thomaston-Upson County	13	0.26%
Monroe County	19	0.50%	Tift County	342	4.55%
Montgomery County	27	2.17%	Toombs County	195	6.92%
Morgan County	15	0.47%	Towns County	0	0.00%
Murray County	285	3.77%	Treutlen County	0	0.00%
Muscogee County	384	1.18%	Troup County	47	0.39%
Newton County	237	1.48%	Turner County	0	0.00%
Oconee County	69	1.19%	Twiggs County	0	0.00%
Oglethorpe County	0	0.00%	Union County	22	0.85%
Paulding County	73	0.33%	Walker County	47	0.53%
Peach County	69	1.70%	Walton County	134	1.20%
Pickens County	26	0.63%	Ware County	41	0.65%
Pierce County	85	2.55%	Warren County	0	0.00%
Pike County	0	0.00%	Washington County	0	0.00%
Polk County	375	5.35%	Wayne County	44	0.82%
Pulaski County	0	0.00%	Webster County	0	0.00%
Putnam County	69	2.65%	Wheeler County	0	0.00%
Quitman County	0	0.00%	White County	0	0.00%
Rabun County	94	4.18%	Whitfield County	1097	8.79%
Randolph County	0	0.00%	Wilcox County	0	0.00%
Richmond County	**78**	**0.23%**	Wilkes County	0	0.00%
Rockdale County	363	2.49%	Wilkinson County	2	0.12%
Schley County	0	0.00%	Worth County	1	0.02%
Screven County	0	0.00%			
Seminole County	5	0.29%			

APPENDIX P:

EMAIL TO SCHOOL SYSTEM ADMINISTRATORS

To Whom It May Concern:

My name is Stacie Pettit, and I am a PhD. candidate at the University of Georgia. I plan to conduct my dissertation research this spring, and would like permission to conduct research in your school system. I will be surveying middle school mathematics teachers about their beliefs toward English to Speakers of Other Languages (ESOL) students in mainstream classrooms. Ultimately, I hope to improve the education of ESOL students in the state of Georgia by providing more resources and training for mathematics teachers of ESOL students.

I have attached documents to provide you with more information on my research. The first attachment is a draft letter for you to modify as you wish if you agree to grant me permission to do research in your school system. Because it must be on school letterhead with your signature, please mail it to me at:

Stacie Pettit
414 Crown Mill Drive
Martinez, GA 30907

Thank you so much for your time. I will provide each teacher with a summary of my results upon completion of the study. Feel free to contact me with any further questions at stacie.pettit@gmail.com or (706-294-9136).

Sincerely,

Stacie Pettit

APPENDIX Q:

DRAFT PARTICPATION AGREEMENT LETTER

This is a draft of what you could possibly send me to give your approval for this research. Feel free to change it as you wish. It must be on school letterhead and include your signature, so please either scan it before attaching it to an email or mail it to:

Stacie Pettit
414 Crown Mill Drive
Martinez, GA 30907

Thank you so much for your time.

ON SCHOOL LETTERHEAD

To Whom It May Concern:

Stacie K. Pettit, Elementary and Social Studies Education Department, University of Georgia, has my permission to conduct the research study titled "Middle School Mathematics Teachers' Beliefs about English Language Learners" in my school or county. She may email teachers concerning her questionnaire and ask teachers for their permission to be interviewed. She may also ask teachers for recommendations for students to interview, and she may interview these students with the students' and their legal guardian's consent.

Sincerely,

Your signature is needed

APPENDIX R:

EMAIL TO PRINCIPALS

Dear Middle School Principals:

My name is Stacie Pettit. I am a doctoral student at the University of Georgia. I have been approved by your school system to collect data for a research study entitled, "Middle School Mathematics Teachers' Beliefs about English Language Learners," which I am conducting to fulfill requirements for my dissertation research. All information obtained will be treated confidentially. This data will guide future studies and hopefully increase the support and resources teachers receive to teach English to Speakers of Other Languages (ESOL) students.

Your school has been chosen as part of a representative sample of schools across Georgia to be surveyed. Unless I hear otherwise from you, I plan to email the mathematics teachers in your school with a link to fill out a questionnaire that should take no more than 10 minutes to complete. I have attached a paper version of the questionnaire so you may look it over if you wish. At your request, I can also email you the scanned letter or email I have giving me the permission to do research in your county.

If possible, perhaps you could mention this survey at a faculty meeting or in an email to your math teachers. Your endorsement of this research will directly affect its success. I would really appreciate your support in my effort to better the education received by ESOL students in the state of Georgia.

Feel free to contact me with any concerns or questions at stacie.pettit@gmail.com or (706) 294-9136.

Sincerely,

Stacie Pettit

APPENDIX S:

EMAIL TO ESOL COORDINATORS

Dear ESOL Coordinators:

My name is Stacie Pettit. I am a doctoral student at the University of Georgia. I have been approved by your school system to collect data for a research study entitled, "Middle School Mathematics Teachers' Beliefs about English Language Learners," which I am conducting to fulfill requirements for my dissertation research. All information obtained will be treated confidentially. This data will guide future studies and hopefully increase the support and resources teachers receive to teach English to Speakers of Other Languages (ESOL) students.

I will be emailing the middle school mathematics teachers in your county with a link to fill out a questionnaire that should take no more than 10 minutes to complete. I have attached a paper version of the questionnaire so you may look it over if you wish.

If possible, perhaps you could forward this information on to your ESOL teachers, so that they can encourage the teachers they come in contact with to participate. Even though they will not be the ones directly participating, their endorsement of this research will directly affect its success. I would really appreciate your support in my effort to better the education received by ESOL students in the state of Georgia.

Feel free to contact me with any concerns or questions at stacie.pettit@gmail.com or (706) 294-9136.

Sincerely,

Stacie Pettit

APPENDIX T:

QUESTIONNAIRE INTRODUCTORY EMAIL

Sent to middle school mathematics teachers and cc-ed to principals

My name is Stacie Pettit. I am a doctoral student at the University of Georgia. Within the next week, I will be sending you an email with a link to complete a questionnaire for my dissertation research entitled, "Middle School Mathematics Teachers' Beliefs about English Language Learners." **The survey should take only about 10 minutes to complete**. I will leave the survey link open for 3 weeks to allow you enough time to complete the questionnaire. This research has been approved at the county and school levels. Your school is part of a representative sample of schools across Georgia.

As a previous middle school mathematics teacher, I understand the difficulties you face when trying to meet the needs of students who are not proficient in English. By completing this questionnaire, you can help improve the education of ESOL students, as well as increase the support and resources teachers like you may receive. Your input is valuable, so I am hoping for a 100% response rate.

To show my appreciation for your time and participation, I have attached four documents that will hopefully be helpful resources to use in serving your ESOL student population.

If you have any questions or concerns, please feel free to contact me at stacie.pettit@gmail.com or (706) 294-9136.

Sincerely,

Stacie Pettit

APPENDIX U:

RESOURCE ATTACHMENTS TO INTRODUCTORY EMAIL

Resource #1: Approaches and Frameworks for Teaching ESOL Students

Sheltered Instruction Observation Protocol (SIOP)
Echevarria, J., & Short, D.J.
http://www.siopinstitute.net/

- Can also be called SDAIE (specially designed academic instruction in English)
- Teachers help students understand difficult content by scaffolding instruction – paraphrasing, giving examples, providing analogies
- Adjust instructional tasks so they are incrementally challenging – preteach vocabulary, have students write outlines
- Language acquisition is enhanced through meaningful use and interaction
- Teachers use various alternative assessments
- Supplementary materials are used to support the academic text

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The Cognitive Academic Language Learning Approach (CALLA)
Chamot, A.U., & O'Malley, J.M. (1994). *The CALLA handbook: Implementing the Cognitive academic language learning approach*. Addison-Wesley Publishing Company.

- Content should be the primary focus of instruction
- Academic language skills can be developed as the need for them emerges from the content
- Teachers select the high priority topics and skills – depth, not breadth

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Using Pictures
Wood, K.D., & Tinajero, J. (2002). Using pictures to teach content to second language learners. *Middle School Journal, 33*(5), pp. 47-51.
Find the complete article at:
http://www.nmsa.org/Publications/MiddleSchoolJournal/May2002/Aticle7/tabid/423/Default.aspx

Joyce and Calhoun (1998) have developed the Picture Word Inductive Model (PWIM), which uses pictures containing familiar objects and actions to elicit words from children's listening and speaking vocabularies. Essentially, students study various pictures and then "shake out" the words they see, while the teacher draws a line to the corresponding word or phrase, spelling it and having the students repeat the pronunciation and spelling. With practice, experience, and modeling, students develop a greater understanding of the conventions of English as they classify the words according to common letter patterns and begin to internalize phonetic and structural principles (Joyce, Hrycauk, & Calhoun, 2001, p. 43).

Into, Through, and Beyond

Brinton, D.M., & Holten, C.

More information can be found at the website where I retrieved this information: http://exchanges.state.gov/forum/vols/vol35/no4/p10.htm

One way of facilitating access to core content text is to apply an *into, through*, and *beyond* framework for CBI lesson planning. This lesson framework, originally adapted from The California Literature Project (Brinton, Goodwin, and Ranks 1994), involves a three-stage process designed to maximize students' comprehension and mastery of content:

Into: In the first stage of the lesson, students' prior knowledge about a concept is probed. Typical into activities include reviews of previously learned content, the use of content-related visuals, reaction journals, vocabulary previews, free association or visualization exercises, and anticipation reaction guides to assist students in accessing the new content material. The end goal of this stage is for students to gain an entree into the topic, recognize the depth of their own prior knowledge, and be better prepared for the new content materials they are about to encounter.

Through: In the second stage, students encounter the new content, relating it to their discussions of the concepts during the into stage. This may entail confirming or rejecting the hypotheses they formed, or expanding their knowledge base with new facts, ideas, or opinions. Activities that are typically found in this lesson stage include grammar development or vocabulary expansion, reading guides (e.g., idea sequencing and/or text completion exercises), and information gap tasks (such as jigsaw reading). *Through* activities also include a variety of text explication exercises, either oral or written. The end goal of this stage is for students to practice new language skills while demonstrating their comprehension of the basic concepts.

Beyond: In the final stage of the framework, students further demonstrate their comprehension by creatively applying their new knowledge. Such application may take several forms: application of the knowledge to personal experience, to an example, to a literary passage, etc. *Beyond* activities involve more extended oral and written output such as role-plays, debates, and essays. The end goal of this stage is for students to demonstrate both conceptual and linguistic mastery, and to provide a forum for communicative language practice.

Other References

Herrell, A.L. (2000). *Fifty strategies for teaching English language learners*. Columbus, Ohio: Merrill.

Kidd, R., & Marquardson, B. (1994). *The Foresee approach to content-based ESL instruction.* Paper presented at the annual meeting of the Teachers of English to Speakers of Other Languages.

Lessow-Hurley, J. (2003). *Meeting the needs of second language learners: An educator's guide*. Alexandria, Virginia: Association for Supervision and Curriculum Development.

The Help! Kit: A Resource Guide for Secondary Teachers of Migrant English Language Learners.

Resource #2: Strategies and Tips to Teach ESOL Students in your Regular Classroom

Curriculum

- Decide what is critical in the curriculum and highlight key points (less is more)
- Review and summarize often

Instruction

- Modeling
- Demonstrations
- Make oral and written language comprehensible – pause more often, use gestures and facial expressions, paraphrase and repeat often, use active rather than passive voice
- Limit the introduction of new vocabulary and introduce new words during purposeful activities
- Make connections with the real world and previous lessons
- Access prior knowledge
- Total Physical Response (TPR) – dramatize or act out vocabulary, use concrete object to represent words
- Accommodate a variety of learning styles – songs, hands-on learning, visuals
- Provide copies of class notes

Assignments

- Use cloze exercises (some words missing from familiar texts)
- Modify the amount of work/shorten assignments
- Dialogue journals – written conversation between student and teacher
- Graphic organizers, outlines, time lines, flow charts, Venn diagrams

Outside your Classroom

- Collaborate with the ESOL teacher
- Involve parents and the community

A Welcoming Environment

- Use classroom routines
- Cooperative learning / peer tutoring
- Use and allow the students to use their native language when possible

Resource #3: Assessing ESOL Students in the Regular Education Classroom

The goal: Reduce the linguistic burden for ESOL students while retaining the responsibility of content mastery.

Possibilities for Assessment	**What to Avoid**
Consider progress	Don't grade solely on effort
Extended time	
Oral tests (Consider recording your voice to use over and over again)	
Think about whether you are measuring content knowledge or language proficiency.	Don't grade ESOL students on their English skills if the purpose of the assignment is to assess knowledge about the water cycle, for example.
Alternative assessments – portfolios and performance-based assessments (Consider giving students a choice)	Don't always provide this as an option for ESOL students and not for the other students.
Use of rubrics (provided to students beforehand)	
Show examples of good work	
Use cloze procedures with outlines, charts, timelines, etc. (use something they have seen in class, but omit some key words)	Try not to encourage memorizing without understanding. You may want to change some words, but keep the general idea.
Reduce choices on multiple-choice tests	
Have the student draw a picture to illustrate a concept	Don't let the students stay at this stage forever. As they progress, encourage them to first label words, then add sentences, etc.
Allow the use of dictionaries or word lists	
Scaffolding assessment – allow students various ways to demonstrate their knowledge	
Group tasks or projects	
Take home tests	Make sure you know the student is not copying the test completely….Getting *some* help may be okay!
Open book assignments	

Resource #4: Internet Resources for Teaching ESOL Students

For the students to use:
http://a4esl.org/ - activities for ESL students

http://www.eslcafe.com/ - for teachers and students – Dave's ESL Café

http://iteslj.org/ESL.html

http://iteslj.org/cw/ - crossword puzzles

www.manythings.org - interesting things for ESOL students

http://www.eslpartyland.com/students/inter.htm

Teacher Resources:
www.tesol.org - professional organization

www.eslcafe.com - Dave's ESL cafe

www.ncela.gwu.edu - National Clearinghouse for English Language Acquisition and Language Instruction Educational Programs

www.glc.k12.ga.us/pandp/esol/accomm.htm - Georgia Department of Education Accommodations for ESOL Students in Regular Education Classrooms

http://jan.ucc.nau.edu/~fls/cbi-bib.html - extensive list of references on Content Based Instruction

http://www.palmbeach.k12.fl.us/Multicultural/MulticulturalNew/ESOLCurriculumSecondarySciGr7.htm - for Science teachers

http://www.eslpartyland.com/teachers/Tinitial.htm

Free Online Translators:
www.google.com/language_tools

http://freetranslation.paralink.com/

APPENDIX V:

QUESTIONNAIRE COVER LETTER

My name is Stacie Pettit. I am a doctoral student at the University of Georgia. You are invited to participate in a research study entitled, "Middle School Mathematics Teachers' Beliefs about English Language Learners," which I am conducting to fulfill requirements for my dissertation research. All information obtained will be treated confidentially. This data will guide future studies and hopefully increase the support and resources you receive to teach English to Speakers of Other Languages (ESOL) students.

At the included web address, you will find a short survey that takes approximately 10 minutes to compete. Please fill out the survey within the next three weeks. There is not an area for you to identify yourself unless you wish to be contacted for a follow-up interview. This survey is to remain completely confidential. The web address is:
http://www.surveymonkey.com/s.aspx?sm=Bro4m44VxP0_2fVXH46M0mbw_3d_3d

If either clicking on the above link or pressing control and clicking on the link do not take you to the survey, you may copy and past the web address above into the web browser.
If you prefer, you may print the survey and mail it to: Stacie Pettit, 124 Oak Meadow Drive, Grenada, MS 38901.

The survey is being sent to all middle school mathematics teachers in a number of counties across Georgia purposefully chosen for their variability. Each and every response is valued and will provide detailed information needed to understand teachers' beliefs. As a participant, you will have the opportunity to reflect on your beliefs about teaching ESOL students. Based on the results of my dissertation, professional development may be designed for mainstream mathematics teachers who work with ESOL students. There are no anticipated risks to participate in this study. Your participation is entirely voluntary. Please note that internet communications are insecure, and there is a limit to the confidentiality that can be guaranteed due to the technology itself. However, once the online survey is received, all information will be kept confidential, and the results of the survey will be reported as group measures. NO information will be reported that will identify any teacher. You are free to refuse to participate in the research and withdraw from the research at any time without penalty or loss of benefits to which I am otherwise entitled. When you complete the survey, you will have agreed to allow the data to be used in the research study. You can be assured your responses are held in confidence.

As a follow up, I would like to interview some teachers about their experiences with ESOL students in mainstream classrooms. While the questionnaire data is very important, I'm sure I will have more questions, and many of you have more to tell me. If you are willing to be interviewed, please include your email address in the space provided on the questionnaire. Your questionnaire will remain confidential even if you agree to be interviewed.

Thank you for your valuable input. Should you wish to receive additional information regarding the results or any other aspect of this study, please do not hesitate to contact me at stacie.pettit@gmail.com or (706) 294-9136. Thank you again for your participation.
Sincerely,
Stacie Pettit
Primary Researcher

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706)542-3199; Email address IRB@uga.edu

APPENDIX W:

FIRST AND SECOND FOLLOW-UP EMAILS

Dear fellow teachers,

Thank you so much to those who completed the questionnaire, "Middle School Mathematics Teachers' Beliefs about English Language Learners." I have received emails from many of you, but have left you on the list so that I can share the results with you this fall.

I will be closing the questionnaire next week. If you have not had a chance to go to the link, I sincerely hope you can do so soon. Please just answer whatever questions you have time to answer. Those in the county office as well as your principal have endorsed this research. Since I do not ask for any identifying information on the web survey, your answers will be completely confidential.

Here is the link:

http://www.surveymonkey.com/s.aspx?sm=Bro4m44VxP0_2fVXH46M0mbw_3d_3d

I truly appreciate your time in helping me with my dissertation research, but more importantly **hope to provide mathematics teachers across the state with more resources to teach ESOL students by reporting the findings from this study**. A minimum number of teachers is needed in order for the findings to be statistically meaningful. I need you to help spread the word about what you need to serve your students more effectively.

As always, feel free to contact me at stacie.pettit@gmail.com or (706) 294-9136 with any questions.

Sincerely,

Stacie Pettit

Dear Georgia middle school mathematics teacher,

Two weeks ago, I sent you an email requesting that you complete a web-based questionnaire entitled, "Middle School Mathematics Teachers' Beliefs about English Language Learners." If you have already completed the questionnaire, **thank you** for your participation, and please ignore this reminder. Since the questionnaire is confidential, I do not know who has or has not completed the questionnaire.

If you have not completed the questionnaire, I would appreciate it if you could click on the following link and complete the questionnaire **at your earliest convenience. It should only take about 10 minutes of your time**. Since I do not ask for any identifying information on the web survey, your answers will be completely confidential. If enough people respond, I plan for this to be my last reminder. I apologize for taking so much of your time by emailing.

http://www.surveymonkey.com/s.aspx?sm=Bro4m44VxP0_2fVXH46M0mbw_3d_3d

Thanks in advance for your participation. The information you provide could help to improve the education of ESOL students in the state of Georgia, as well as **increase the support for mathematics teachers of ESOL students**.

As always, feel free to contact me at stacie.pettit@gmail.com or (706) 294-9136 with any questions.

Sincerely,

Stacie Pettit

APPENDIX X:

FREQUENCY TABLES FOR ORIGINAL VARIABLES

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	18	17.0	17.1	17.1
	female	87	82.1	82.9	100.0
	Total	105	99.1	100.0	
Missing	System	1	.9		
Total		106	100.0		

Do you speak another language other than English?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	20	18.9	19.2	19.2
	no	84	79.2	80.8	100.0
	Total	104	98.1	100.0	
Missing	System	2	1.9		
Total		106	100.0		

What level of proficiency have you attained in your strongest additional language?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	beginning	11	10.4	44.0	44.0
	intermediate	9	8.5	36.0	80.0
	advanced	5	4.7	20.0	100.0
	Total	25	23.6	100.0	
Missing	System	81	76.4		
Total		106	100.0		

How many times have you traveled to a non-English speaking country in your lifetime?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 times	39	36.8	37.5	37.5
	1 time	16	15.1	15.4	52.9
	2 times	20	18.9	19.2	72.1
	3-5 times	19	17.9	18.3	90.4
	6 or more times	10	9.4	9.6	100.0
	Total	104	98.1	100.0	
Missing	System	2	1.9		
Total		106	100.0		

Have you lived in a non-English speaking country for more than a month?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	16	15.1	15.5	15.5
	no	87	82.1	84.5	100.0
	Total	103	97.2	100.0	
Missing	System	3	2.8		
Total		106	100.0		

Prior to this year, how many years have you completed as a school teacher?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 years	3	2.8	2.9	2.9
	1 year	9	8.5	8.7	11.5
	2-5 years	26	24.5	25.0	36.5
	6-10 years	22	20.8	21.2	57.7
	11-15 years	18	17.0	17.3	75.0
	16 or more years	26	24.5	25.0	100.0
	Total	104	98.1	100.0	
Missing	System	2	1.9		
Total		106	100.0		

Percent ESOLCollapsed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	lowest	36	34.0	41.4	41.4
	middle	32	30.2	36.8	78.2
	highest	19	17.9	21.8	100.0
	Total	87	82.1	100.0	
Missing	System	19	17.9		
Total		106	100.0		

This year, to how many total students do you teach mathematics?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	8	1	.9	1.0	1.9
	12	1	.9	1.0	2.9
	20	1	.9	1.0	3.8
	25	1	.9	1.0	4.8
	27	1	.9	1.0	5.8
	40	1	.9	1.0	6.7
	41	1	.9	1.0	7.7
	42	1	.9	1.0	8.7
	47	1	.9	1.0	9.6
	50	4	3.8	3.8	13.5
	55	2	1.9	1.9	15.4
	60	1	.9	1.0	16.3
	61	1	.9	1.0	17.3
	65	2	1.9	1.9	19.2
	68	1	.9	1.0	20.2
	70	4	3.8	3.8	24.0
	75	4	3.8	3.8	27.9
	77	1	.9	1.0	28.8
	78	1	.9	1.0	29.8
	80	3	2.8	2.9	32.7
	81	1	.9	1.0	33.7
	82	1	.9	1.0	34.6
	83	1	.9	1.0	35.6
	85	1	.9	1.0	36.5
	87	1	.9	1.0	37.5
	90	3	2.8	2.9	40.4
	92	2	1.9	1.9	42.3
	93	1	.9	1.0	43.3
	95	7	6.6	6.7	50.0
	96	7	6.6	6.7	56.7
	98	3	2.8	2.9	59.6
	100	10	9.4	9.6	69.2
	101	2	1.9	1.9	71.2
	103	1	.9	1.0	72.1
	104	1	.9	1.0	73.1
	105	5	4.7	4.8	77.9
	107	2	1.9	1.9	79.8
	108	3	2.8	2.9	82.7
	110	8	7.5	7.7	90.4
	115	2	1.9	1.9	92.3
	120	5	4.7	4.8	97.1
	122	1	.9	1.0	98.1
	125	1	.9	1.0	99.0
	140	1	.9	1.0	100.0
	Total	104	98.1	100.0	
Missing	System	2	1.9		
Total		106	100.0		

This year, approximately how many total students who receive ESOL services are in your mathematics classes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	9	8.5	10.2	10.2
	2	10	9.4	11.4	21.6
	3	9	8.5	10.2	31.8
	4	6	5.7	6.8	38.6
	5	9	8.5	10.2	48.9
	6	4	3.8	4.5	53.4
	7	5	4.7	5.7	59.1
	8	2	1.9	2.3	61.4
	9	1	.9	1.1	62.5
	10	3	2.8	3.4	65.9
	11	1	.9	1.1	67.0
	12	1	.9	1.1	68.2
	13	1	.9	1.1	69.3
	14	2	1.9	2.3	71.6
	15	3	2.8	3.4	75.0
	17	1	.9	1.1	76.1
	18	1	.9	1.1	77.3
	20	4	3.8	4.5	81.8
	25	6	5.7	6.8	88.6
	28	1	.9	1.1	89.8
	29	1	.9	1.1	90.9
	30	2	1.9	2.3	93.2
	31	1	.9	1.1	94.3
	35	1	.9	1.1	95.5
	40	1	.9	1.1	96.6
	45	1	.9	1.1	97.7
	47	1	.9	1.1	98.9
	50	1	.9	1.1	100.0
	Total	88	83.0	100.0	
Missing	System	18	17.0		
Total		106	100.0		

How often do you modify assignments for an ESOL student?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	18	17.0	18.6	18.6
	a couple times a yea	5	4.7	5.2	23.7
	about once a month	10	9.4	10.3	34.0
	about once a week	26	24.5	26.8	60.8
	almost everyday or everyday	38	35.8	39.2	100.0
	Total	97	91.5	100.0	
Missing	System	9	8.5		
Total		106	100.0		

Have you received any training in the area of teaching ELLs?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	48	45.3	46.6	46.6
	no	55	51.9	53.4	100.0
	Total	103	97.2	100.0	
Missing	System	3	2.8		
Total		106	100.0		

Approximately how many hours of training have you received dealing specifically with ESOL students? (binned)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<20	61	57.5	82.4	82.4
	20 - 72	9	8.5	12.2	94.6
	73 - 126	3	2.8	4.1	98.6
	127+	1	.9	1.4	100.0
	Total	74	69.8	100.0	
Missing	System	32	30.2		
Total		106	100.0		

I welcome the inclusion of ESOL students in my class.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	3.8	3.9	3.9
	Neither Agree nor Disagree	10	9.4	9.8	13.7
	Agree	31	29.2	30.4	44.1
	Strongly Agree	57	53.8	55.9	100.0
	Total	102	96.2	100.0	
Missing	N/A Not applicable	1	.9		
	System	3	2.8		
	Total	4	3.8		
Total		106	100.0		

The inclusion of ESOL students in regular education classes benefits all students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	1.9	2.0	2.0
	Disagree	12	11.3	11.9	13.9
	Neither Agree nor Disagree	25	23.6	24.8	38.6
	Agree	33	31.1	32.7	71.3
	Strongly Agree	29	27.4	28.7	100.0
	Total	101	95.3	100.0	
Missing	N/A Not applicable	1	.9		
	System	4	3.8		
	Total	5	4.7		
Total		106	100.0		

ESOL students should not be included in regular education classes until they attian a minimum level of English proficiency.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	5.7	6.1	6.1
	Disagree	19	17.9	19.2	25.3
	Neither Agree nor Disagree	21	19.8	21.2	46.5
	Agree	42	39.6	42.4	88.9
	Strongly Agree	11	10.4	11.1	100.0
	Total	99	93.4	100.0	
Missing	N/A Not applicable	4	3.8		
	System	3	2.8		
	Total	7	6.6		
Total		106	100.0		

The inclusion of ESOL students increases my workload.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	5.7	5.8	5.8
	Disagree	19	17.9	18.4	24.3
	Neither Agree nor Disagree	21	19.8	20.4	44.7
	Agree	42	39.6	40.8	85.4
	Strongly Agree	11	10.4	10.7	96.1
	N/A Not applicable	4	3.8	3.9	100.0
	Total	103	97.2	100.0	
Missing	System	3	2.8		
Total		106	100.0		

The ESOL students in my class hinder the learning of the other students in the class.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	25	23.6	24.3	24.3
	Disagree	44	41.5	42.7	67.0
	Neither Agree nor Disagree	21	19.8	20.4	87.4
	Agree	6	5.7	5.8	93.2
	Strongly Agree	3	2.8	2.9	96.1
	N/A Not applicable	4	3.8	3.9	100.0
	Total	103	97.2	100.0	
Missing	System	3	2.8		
Total		106	100.0		

It is difficult for mainstream teachers to find enough time to deal with the needs of ESOL students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	8.5	8.9	8.9
	Disagree	20	18.9	19.8	28.7
	Neither Agree nor Disagree	21	19.8	20.8	49.5
	Agree	35	33.0	34.7	84.2
	Strongly Agree	16	15.1	15.8	100.0
	Total	101	95.3	100.0	
Missing	N/A Not applicable	1	.9		
	System	4	3.8		
	Total	5	4.7		
Total		106	100.0		

I would rather not have ESOL students in my classes.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	32	30.2	30.5	30.5
	Disagree	35	33.0	33.3	63.8
	Neither Agree nor Disagree	28	26.4	26.7	90.5
	Agree	6	5.7	5.7	96.2
	Strongly Agree	3	2.8	2.9	99.0
	N/A Not applicable	1	.9	1.0	100.0
	Total	105	99.1	100.0	
Missing	System	1	.9		
Total		106	100.0		

I believe ESOL students can master the required curriculum.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	.9	1.0	1.0
	Neither Agree nor Disagree	7	6.6	6.9	7.8
	Agree	44	41.5	43.1	51.0
	Strongly Agree	50	47.2	49.0	100.0
	Total	102	96.2	100.0	
Missing	N/A Not applicable	1	.9		
	System	3	2.8		
	Total	4	3.8		
Total		106	100.0		

ESOL students should not use their native language at school.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	14	13.2	13.6	13.6
	Disagree	35	33.0	34.0	47.6
	Neither Agree nor Disagree	29	27.4	28.2	75.7
	Agree	13	12.3	12.6	88.3
	Strongly Agree	9	8.5	8.7	97.1
	N/A Not applicable	3	2.8	2.9	100.0
	Total	103	97.2	100.0	
Missing	System	3	2.8		
Total		106	100.0		

If students can speak English fluently with their friends, they should be able to understand the mathematics content as well as other students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	8.5	8.7	8.7
	Disagree	41	38.7	39.4	48.1
	Neither Agree nor Disagree	23	21.7	22.1	70.2
	Agree	24	22.6	23.1	93.3
	Strongly Agree	7	6.6	6.7	100.0
	Total	104	98.1	100.0	
Missing	System	2	1.9		
Total		106	100.0		

ESOL students should be able to acquire English within two years of enrolling in U.S. schools.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	7.5	7.6	7.6
	Disagree	25	23.6	23.8	31.4
	Neither Agree nor Disagree	38	35.8	36.2	67.6
	Agree	31	29.2	29.5	97.1
	Strongly Agree	3	2.8	2.9	100.0
	Total	105	99.1	100.0	
Missing	N/A Not applicable	1	.9		
Total		106	100.0		

Language is not an issue in the mathematics classroom.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	44	41.5	42.3	42.3
	Disagree	48	45.3	46.2	88.5
	Neither Agree nor Disagree	9	8.5	8.7	97.1
	Agree	3	2.8	2.9	100.0
	Total	104	98.1	100.0	
Missing	System	2	1.9		
Total		106	100.0		

Children all over the world learn mathematics the same way.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	43	40.6	41.3	41.3
	Disagree	48	45.3	46.2	87.5
	Neither Agree nor Disagree	9	8.5	8.7	96.2
	Agree	3	2.8	2.9	99.0
	Strongly Agree	1	.9	1.0	100.0
	Total	104	98.1	100.0	
Missing	System	2	1.9		
Total		106	100.0		

I am well prepared to teach the ESOL students in my classes.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	10	9.4	9.9	9.9
	Disagree	39	36.8	38.6	48.5
	Neither Agree nor Disagree	27	25.5	26.7	75.2
	Agree	22	20.8	21.8	97.0
	Strongly Agree	3	2.8	3.0	100.0
	Total	101	95.3	100.0	
Missing	N/A Not applicable	3	2.8		
	System	2	1.9		
	Total	5	4.7		
Total		106	100.0		

I can adapt my instruction so that ELLs can master the material in math.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	4.7	4.8	4.8
	Disagree	16	15.1	15.4	20.2
	Neither Agree nor Disagree	25	23.6	24.0	44.2
	Agree	48	45.3	46.2	90.4
	Strongly Agree	10	9.4	9.6	100.0
	Total	104	98.1	100.0	
Missing	N/A Not applicable	2	1.9		
Total		106	100.0		

I am good at helping ELLs understand the material in my classes.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.9	1.0	1.0
	Disagree	17	16.0	17.0	18.0
	Neither Agree nor Disagree	29	27.4	29.0	47.0
	Agree	45	42.5	45.0	92.0
	Strongly Agree	8	7.5	8.0	100.0
	Total	100	94.3	100.0	
Missing	N/A Not applicable	4	3.8		
	System	2	1.9		
	Total	6	5.7		
Total		106	100.0		

Speaking English at home will facilitate English acquisition for ELLs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.9	1.0	1.0
	Disagree	5	4.7	4.8	5.8
	Neither Agree nor Disagree	17	16.0	16.3	22.1
	Agree	50	47.2	48.1	70.2
	Strongly Agree	31	29.2	29.8	100.0
	Total	104	98.1	100.0	
Missing	System	2	1.9		
Total		106	100.0		

I regularly speak with the ESOL teacher at my school.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	3.8	4.2	4.2
	Disagree	31	29.2	32.6	36.8
	Neither Agree nor Disagree	19	17.9	20.0	56.8
	Agree	31	29.2	32.6	89.5
	Strongly Agree	10	9.4	10.5	100.0
	Total	95	89.6	100.0	
Missing	N/A Not applicable	9	8.5		
	System	2	1.9		
	Total	11	10.4		
Total		106	100.0		

It is unfair to make classwork modifications for ESOL students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	18	17.0	17.3	17.3
	Disagree	69	65.1	66.3	83.7
	Neither Agree nor Disagree	14	13.2	13.5	97.1
	Agree	3	2.8	2.9	100.0
	Total	104	98.1	100.0	
Missing	N/A Not applicable	2	1.9		
Total		106	100.0		

It is good practice to allow ESOL students additional time to complete coursework and assignments.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	3.8	3.9	3.9
	Neither Agree nor Disagree	14	13.2	13.7	17.6
	Agree	69	65.1	67.6	85.3
	Strongly Agree	15	14.2	14.7	100.0
	Total	102	96.2	100.0	
Missing	N/A Not applicable	2	1.9		
	System	2	1.9		
	Total	4	3.8		
Total		106	100.0		

It is good practice to read quizzes and tests aloud to ESOL students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	8	7.5	8.0	8.0
	Neither Agree nor Disagree	20	18.9	20.0	28.0
	Agree	55	51.9	55.0	83.0
	Strongly Agree	17	16.0	17.0	100.0
	Total	100	94.3	100.0	
Missing	N/A Not applicable	4	3.8		
	System	2	1.9		
	Total	6	5.7		
Total		106	100.0		

Teachers should not give ESOL students a failing grade if the students show effort.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	2.8	3.1	3.1
	Disagree	30	28.3	30.6	33.7
	Neither Agree nor Disagree	22	20.8	22.4	56.1
	Agree	35	33.0	35.7	91.8
	Strongly Agree	8	7.5	8.2	100.0
	Total	98	92.5	100.0	
Missing	N/A Not applicable	2	1.9		
	System	6	5.7		
	Total	8	7.5		
Total		106	100.0		

ESOL students should not be graded on work that they cannot read.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	2.8	3.1	3.1
	Disagree	16	15.1	16.5	19.6
	Neither Agree nor Disagree	27	25.5	27.8	47.4
	Agree	40	37.7	41.2	88.7
	Strongly Agree	11	10.4	11.3	100.0
	Total	97	91.5	100.0	
Missing	N/A Not applicable	3	2.8		
	System	6	5.7		
	Total	9	8.5		
Total		106	100.0		

Teachers should modify assignments for ESOL students in regular education classes.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.9	1.0	1.0
	Disagree	5	4.7	5.2	6.2
	Neither Agree nor Disagree	23	21.7	23.7	29.9
	Agree	53	50.0	54.6	84.5
	Strongly Agree	15	14.2	15.5	100.0
	Total	97	91.5	100.0	
Missing	N/A Not applicable	3	2.8		
	System	6	5.7		
	Total	9	8.5		
Total		106	100.0		

ESOL students can show understanding on a few mathematics exercises, rather than be given the whole assignment.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.9	1.0	1.0
	Disagree	20	18.9	20.6	21.6
	Neither Agree nor Disagree	22	20.8	22.7	44.3
	Agree	40	37.7	41.2	85.6
	Strongly Agree	14	13.2	14.4	100.0
	Total	97	91.5	100.0	
Missing	N/A Not applicable	3	2.8		
	System	6	5.7		
	Total	9	8.5		
Total		106	100.0		

ESOL students are best taught using direct instruction/lecture to the entire class.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	4.7	5.4	5.4
	Disagree	53	50.0	57.6	63.0
	Neither Agree nor Disagree	29	27.4	31.5	94.6
	Agree	4	3.8	4.3	98.9
	Strongly Agree	1	.9	1.1	100.0
	Total	92	86.8	100.0	
Missing	N/A Not applicable	4	3.8		
	System	10	9.4		
	Total	14	13.2		
Total		106	100.0		

I use collaborative learning as a strategy to teach my ESOL students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	3	2.8	3.4	3.4
	Neither Agree nor Disagree	14	13.2	15.9	19.3
	Agree	51	48.1	58.0	77.3
	Strongly Agree	20	18.9	22.7	100.0
	Total	88	83.0	100.0	
Missing	N/A Not applicable	8	7.5		
	System	10	9.4		
	Total	18	17.0		
Total		106	100.0		

I use differentiation to meet the needs of the ESOL students in my classes.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	4.7	5.6	5.6
	Neither Agree nor Disagree	15	14.2	16.9	22.5
	Agree	50	47.2	56.2	78.7
	Strongly Agree	19	17.9	21.3	100.0
	Total	89	84.0	100.0	
Missing	N/A Not applicable	6	5.7		
	System	11	10.4		
	Total	17	16.0		
Total		106	100.0		

I am not responsible for the mathematics achievement of students who have limited English proficiency.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	29	27.4	30.2	30.2
	Disagree	48	45.3	50.0	80.2
	Neither Agree nor Disagree	9	8.5	9.4	89.6
	Agree	4	3.8	4.2	93.8
	Strongly Agree	1	.9	1.0	94.8
	N/A Not applicable	5	4.7	5.2	100.0
	Total	96	90.6	100.0	
Missing	System	10	9.4		
Total		106	100.0		

It is my responsibility to bring ESOL students up to the same level as other students mathematically.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	1.9	2.2	2.2
	Disagree	6	5.7	6.5	8.7
	Neither Agree nor Disagree	16	15.1	17.4	26.1
	Agree	52	49.1	56.5	82.6
	Strongly Agree	16	15.1	17.4	100.0
	Total	92	86.8	100.0	
Missing	N/A Not applicable	3	2.8		
	System	11	10.4		
	Total	14	13.2		
Total		106	100.0		

I have great control over the mathematical success of ESOL students in my class.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	.9	1.1	1.1
	Disagree	19	17.9	20.9	22.0
	Neither Agree nor Disagree	35	33.0	38.5	60.4
	Agree	31	29.2	34.1	94.5
	Strongly Agree	5	4.7	5.5	100.0
	Total	91	85.8	100.0	
Missing	N/A Not applicable	5	4.7		
	System	10	9.4		
	Total	15	14.2		
Total		106	100.0		

I have adequate training to work with ESOL students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	19	17.9	21.1	21.1
	Disagree	35	33.0	38.9	60.0
	Neither Agree nor Disagree	14	13.2	15.6	75.6
	Agree	18	17.0	20.0	95.6
	Strongly Agree	4	3.8	4.4	100.0
	Total	90	84.9	100.0	
Missing	N/A Not applicable	4	3.8		
	System	12	11.3		
	Total	16	15.1		
Total		106	100.0		

I would like to receive more professional development in teaching ESOL students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	10	9.4	10.6	10.6
	Neither Agree nor Disagree	14	13.2	14.9	25.5
	Agree	41	38.7	43.6	69.1
	Strongly Agree	29	27.4	30.9	100.0
	Total	94	88.7	100.0	
Missing	N/A Not applicable	2	1.9		
	System	10	9.4		
	Total	12	11.3		
Total		106	100.0		

I have the resources I need to successfully teach the ESOL students in my mathematics classroom.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	15	14.2	16.5	16.5
	Disagree	29	27.4	31.9	48.4
	Neither Agree nor Disagree	26	24.5	28.6	76.9
	Agree	20	18.9	22.0	98.9
	Strongly Agree	1	.9	1.1	100.0
	Total	91	85.8	100.0	
Missing	N/A Not applicable	4	3.8		
	System	11	10.4		
	Total	15	14.2		
Total		106	100.0		

APPENDIX Y:

FREQUENCY TABLES FOR COLLAPSED AND REVERSE CODED VARIABLES

Reverse Coded: The ESOL students in my class hinder the learning of the other students in the class.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	3	2.8	3.0	3.0
	1	1	.9	1.0	4.0
	Agree	6	5.7	5.9	9.9
	2	1	.9	1.0	10.9
	Neither Agree nor Disagree	21	19.8	20.8	31.7
	Disagree	44	41.5	43.6	75.2
	Strongly Disagree	25	23.6	24.8	100.0
	Total	101	95.3	100.0	
Missing	N/A Not applicable	4	3.8		
	System	1	.9		
	Total	5	4.7		
Total		106	100.0		

Reverse Coded: I would rather not have ESOL students in my classes.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	3	2.8	2.9	2.9
	Agree	6	5.7	5.8	8.7
	Neither Agree nor Disagree	28	26.4	26.9	35.6
	Disagree	35	33.0	33.7	69.2
	Strongly Disagree	32	30.2	30.8	100.0
	Total	104	98.1	100.0	
Missing	N/A Not applicable	1	.9		
	System	1	.9		
	Total	2	1.9		
Total		106	100.0		

Reversed coded: ESOL students should not use their native language at school.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	14	13.2	14.0	14.0
	Agree	35	33.0	35.0	49.0
	Neither Agree nor Disagree	29	27.4	29.0	78.0
	Disagree	13	12.3	13.0	91.0
	Strongly Disagree	9	8.5	9.0	100.0
	Total	100	94.3	100.0	
Missing	N/A Not applicable	3	2.8		
	System	3	2.8		
	Total	6	5.7		
Total		106	100.0		

Reverse Coded: It is unfair to make classwork modifications for ESOL students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	3	2.8	2.9	2.9
	Neither Agree nor Disagree	14	13.2	13.5	16.3
	Disagree	69	65.1	66.3	82.7
	Strongly Disagree	18	17.0	17.3	100.0
	Total	104	98.1	100.0	
Missing	N/A Not applicable	2	1.9		
Total		106	100.0		

Reverse Coded: I am not responsible for the mathematics achievement of students who have limited English proficiency.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	1	.9	1.1	1.1
	Agree	4	3.8	4.4	5.5
	Neither Agree nor Disagree	9	8.5	9.9	15.4
	Disagree	48	45.3	52.7	68.1
	Strongly Disagree	29	27.4	31.9	100.0
	Total	91	85.8	100.0	
Missing	N/A Not applicable	5	4.7		
	System	10	9.4		
	Total	15	14.2		
Total		106	100.0		

Collapsed: How many times have you traveled to a non-English speaking country in your lifetime?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 times	39	36.8	37.5	37.5
	1 or 2 times	36	34.0	34.6	72.1
	3 or more times	29	27.4	27.9	100.0
	Total	104	98.1	100.0	
Missing	System	2	1.9		
Total		106	100.0		

Collapsed: How many years have you completed as a school teacher?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 or 1 year	12	11.3	11.5	11.5
	2-10 years	48	45.3	46.2	57.7
	11 or more years	44	41.5	42.3	100.0
	Total	104	98.1	100.0	
Missing	System	2	1.9		
Total		106	100.0		

Collapsed: How often do you modify assignments for an ESOL student?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never or a couple times a year	23	21.7	23.7	23.7
	about once a week or about once a month	36	34.0	37.1	60.8
	almost everyday or everyday	38	35.8	39.2	100.0
	Total	97	91.5	100.0	
Missing	System	9	8.5		
Total		106	100.0		

APPENDIX Z:

EXAMPLES OF CATEGORIES AND THEMES IN QUALITATIVE ANALYSES

Category Examples	Predetermined?	Research Question
Advantages	Yes	1
Challenges	Yes	1
Placement in mainstream classroom	Yes	1
Native language	Yes	1
Teachers' beliefs about assessment with ELLs	Yes	1
Teaching experience, lived in a non-English speaking country, training received, gender, languages spoken, travel experience, ELL percentages	Yes	2
Modifications: differentiation, collaborative learning	Yes	3
Strategies: ESOL teacher, games, bilingual resources	No	3
Professional development	Yes	4
ESOL teacher collaboration	Yes	4
Students' opinions about assessment in mathematics	No	5
Students' experiences with teacher strategies used	Yes	5
Students' opinions about materials in mathematics: tests, textbooks, worksheets	No	5

Theme Examples	Research Question
ELLs motivation to learn	1
Lack of time	1
Reading in math	1
Vocabulary in math	1
Language learning in math	1
Responsibility for ELLs	1
Parental and home support	1
Bilingual textbooks and resources	3
Lack of collaboration	3
Mathematics/ESOL teacher tension	4
Words in mathematics	5
Writing in mathematics	5
Inconsistency in assessment	5
Bilingual resources desired	5

Note. No themes were predetermined, but were created based on participant responses to open-ended items and comments during interviews.