Abstract

The purpose of this study was to explore the beliefs middle school mathematics teachers have about ELLs, to identify the strategies used to help ELLs, and to explore the support teachers need to teach ELLs. A questionnaire was completed by 106 middle school mathematics teachers from 11 school systems in Georgia.

Middle School Mathematics Teachers’ Beliefs about ELLs in Mainstream Classrooms

English Language Learners (ELLs) are the fastest growing student population in public schools (Jones, 2002). According to the Migration Policy Institute, Georgia in particular had a 52.1 percent increase its English language learner population between 2000 and 2010. Georgia ranks 8 out of the 51 states for the largest sized ELL population (Migration Policy Institute, 2010). The experiences ELLs will have in school are dependent upon the beliefs of the teachers they encounter. However, many teachers are not adequately prepared to work with a linguistically diverse student population (Gandara, Rumberger, Maxwell-Jolly, & Callahan, 2003; Jones, 2002). Without proper training, it is difficult to hold teachers accountable for feelings of inadequacy. Only 12.5% of U.S. teachers have received eight or more hours of recent training to teach students of limited English proficiency (National Center for Education Statistics, 2002). Because mainstream teachers are very likely to teach ELLs at some point in their careers, they need to be equipped with the skills to meet the needs of those students.

The term teacher belief has many definitions (Author, 2011a). Sahin, Bullock, and Stables (2002) indicate the idea of belief may refer to “perceptions, assumptions, implicit and explicit theories, judgments, opinions, and more” (p. 373). Many scholars differentiate knowledge from belief (Calderhead, 1996; Nespor, 1987; Pajares, 1992), while other researchers
do not differentiate beliefs and knowledge (Kagan, 1992). Here, I have chosen to use the
definition of “belief “ to include mental constructs such as knowledge, attitudes, and perceptions.
Teachers’ beliefs about ELLs, referred to herein, include knowledge about second language
acquisition, attitudes toward having ELLs in mainstream classrooms, as well as beliefs
concerning the role of the ESOL teacher.

Purpose

The purpose of this study was to explore the beliefs middle school mathematics teachers
have about the ELLs in their classrooms. In addition, I identified the strategies these mathematics
teachers reported using to help the ELLs in their classrooms. I also explored the support teachers
need to teach the ELLs in their classrooms. The following research questions guided the study:
(1) What are the beliefs of middle school mathematics teachers about ELLs in mainstream
classrooms?, (2) What reported strategies, if any, do teachers use to help ELLs succeed, and (3)
What types of support do teachers receive, and what additional support could they use to meet
the needs of ELLs?.

Teachers can no longer expect that because a student is labeled Limited English
Proficient (LEP), federal designation to describe ELLs, his or her test scores will not count in
grading the school. Instead, under The No Child Left Behind Act (2001), schools are graded on
the percentage of ELL 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 Common Core State Standards, adopted by Georgia, place an emphasis on problem solving and communication (Georgia Department of Education, 2013). 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).

**Mathematics and English Language Learners**

A positive relationship exists between English proficiency and mathematics achievement (Cahnmann & Hornberger, 2000; Remillard & Cahnmann, 2005). English (2007) notes that “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.” 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). Clearly the language demands embedded in mathematics must be addressed for ELLs for conceptual understanding. Students need language skills, as well as cultural knowledge to perform well in mathematics (Author, 2011b).

**Review of the Related Literature**

Teachers’ beliefs influence their classroom behavior (Pajares, 1992; Rueda & Garcia, 1996) and affect student learning. Fang (1996) writes, “teachers teach in accordance with their theoretical beliefs” (p. 53). 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). Many researchers (Rueda & Garcia, 1996; Walker, Shafer, & Iams, 2004) have found that training affects teachers’ practice in working with ELLs.

Researchers have found that teachers hold misconceptions about how second languages are learned (Karabenick & Noda, 2005; Reeves, 2006). For example, Reeves’ participants 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. Similarly, Karabenick and Noda (2005) found that teachers believed the use of a first language at home interferes with learning a second language. 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; Lee, 2002).

Richardson (1996) states that the study of beliefs is a crucial element in teacher education because beliefs “drive classroom actions and influence the teacher change process” (p. 102).
Furthermore, Macnab and Payne (2003) point out “the beliefs and attitudes of teachers—cultural, ideological and personal—are significant determinants of the way they view their role as educators” (p. 55). Therefore, not only do teachers’ beliefs affect the expectations they hold of students, but their actions in the classroom also reflect their beliefs. Beliefs affect not only what teachers see as their purpose in teaching, but also the ways teachers think about their subject matter and the choices they make in their teaching (Richardson, 1996). Teachers will emphasize different aspects of the curriculum based on their stance on education. Teachers make choices throughout a lesson, a unit, or a course, each of which is influenced by their beliefs (Author, 2011a).

Rueda and Garcia (1996) found that teachers’ beliefs about second language learning and teaching shape their perceptions and judgments, which, in turn, affect students’ behavior in the classroom. This shows the powerful implications teachers’ beliefs hold for the ELLs in their classrooms. Similarly, teachers’ attitudes toward ELLs affect the classroom interaction between these students and the teacher, which ultimately affects achievement (Mantero & McVicker, 2006). In particular, teachers’ beliefs about their ability to meet the needs of ELLs account for high student motivation and performance (Karabenick & Noda, 2005).

Many teachers hold numerous misconceptions about the best ways to learn a second language and have low expectations of ELLs (Author, 2011a). For example, Walker, Shafer, and Iams (2004) found that teachers were not interested in having ELLs in their classroom and that many objected to adapting classroom instruction for ELLs. In fact, “mainstream teachers must adopt a new set of beliefs in order to be effective with the ELLs in their classrooms. These beliefs for the successful inclusion of ELLs include the following: (1) high expectations for ELLs, (2) accepting responsibility for ELLs, (3)
encouraging native language use both at home and in the classroom, (4) an awareness of the time it takes ELLs to learn academic English, and (5) a desire for professional development in relation to ELLs when needed” (Author, 2011a).

**Method**

Middle school mathematics teachers of ELLs completed the “Mathematics Teachers’ Beliefs about English Language Learners Questionnaire” (http://www.surveymonkey.com/s.aspx?sm=Bro4m44VxP0_2fVXH46M0mbw_3d_3d). The questionnaire was created by this author and subsequently distributed to 439 teachers in 11 school systems in Georgia. Statistical Package for the Social Sciences (SPSS) was used to analyze the questionnaire results. Interviews of teachers and ELLs were conducted, but due to space limitations, only the quantitative data will be reported here.

**Procedures**

I sent out a web-based questionnaire as an HTML link through email. A web-based questionnaire is the collection of data through a self-administered electronic set of items on the web (Archer, 2003). One advantage of web-based questionnaires is that data can easily be imported into a data analysis program (Archer, 2003; Dillman, 2000); I used Survey Monkey to gather the 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).

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 narrowed the topics and drafted 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 created a conceptual framework 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 Survey Monkey to convert the questionnaire into its final web-based form. Survey Monkey 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 was 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 asked teachers to identify their school system. In order to increase the internal reliability of the questionnaire, six of the items are negatively worded.

Fourteen of the 56 items were borrowed from other researchers and modified; 10 items derived from the work of Reeves (2006), and 4 items derived from Karabenick and Noda (2005). I modified the wording in the items to maintain terminology, such as ESOL student.
Of the 24 items under the topic of teacher beliefs, 12 items focused on beliefs about the impact of having ELLs in mainstream mathematics classrooms, and 4 items focused on beliefs about how languages are learned. Because teachers’ self efficacies have been shown to affect student success (Garcia, 1996; McSwain, 2001), six questions focused on teachers’ beliefs about how they are doing in meeting the needs of the ELLs in their classrooms. Because this questionnaire was intended for mathematics teachers, two questions focused specifically on teachers’ beliefs about mathematics in relation to ELLs.

Eleven questionnaire items concentrated on factors influencing teacher beliefs. These items elicited 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. For example, Youngs and Youngs found that the population of ELLs can affect teachers’ beliefs (2001).

The 13 items under the topic of teacher strategies focused 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 included 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 was 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.

A combination of cluster and purposeful sampling was employed to choose school systems that varied in size and location across Georgia to participate in the study. This process resulted in the identification of 16 school systems for possible participation in this study. Of the 16 counties, 11 agreed to participate, 3 declined to participate, and 2 did not respond. There were a total of 55 middle schools in the 11 participating school systems.

There were 439 grades 6-8 mathematics teachers in the 55 participating schools. 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 413. The questionnaires were anonymous. 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 to all the teachers. One week later, I sent a final reminder email. I closed the questionnaire 2 weeks after the final reminder email was sent.

Results

Response Rate

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%. Nonresponse error should be approached from the standpoint of representativeness of
the respondents. 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 the prior year. Eighteen of the respondents were male, and 87 were female. Twenty-three respondents indicated they spoke a language other than English, and three spoke more than one language other than English. Eighty-seven of the respondents never lived in a non-English speaking country for more than one month. The number of students the respondents taught mathematics to 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. Table 1 shows the number of years respondents completed as a school teacher.
Table 1

*Number of Years Respondents Completed as a School Teacher*

<table>
<thead>
<tr>
<th>Years as a Teacher</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 years</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>1 year</td>
<td>9</td>
<td>8%</td>
</tr>
<tr>
<td>2-5 years</td>
<td>26</td>
<td>25%</td>
</tr>
<tr>
<td>6-10 years</td>
<td>22</td>
<td>21%</td>
</tr>
<tr>
<td>11-15 years</td>
<td>18</td>
<td>17%</td>
</tr>
<tr>
<td>16 or more years</td>
<td>26</td>
<td>24%</td>
</tr>
<tr>
<td>Not Reported</td>
<td>2</td>
<td>2%</td>
</tr>
</tbody>
</table>
Analyses

The questionnaire was analyzed through crosstabs, correlations, and analyses of variance (ANOVA) using Statistical Package for the Social Sciences (SPSS) software. An alpha level of .05 was used for all statistical tests. 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 data from the questionnaire indicated many teachers were optimistic about teaching ELLs. For example, 86% of teachers welcomed the inclusion of ELLs in their classes, and 92% trusted that ELLs could master the required curriculum when given proper support. Additionally, 61% of teachers believed that the inclusion of ELLs in mainstream classes benefits all students.

The questionnaire data indicated that teachers were 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 believed they could adapt their instruction so that ELLs can understand the material presented.

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 (88%) and a lack of time (50%). 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 minimum level of English proficiency. Trying to communicate with ELLs was challenging for many teachers. Specifically, only 3% reported on the questionnaire that they agree or strongly agree that language was not an issue. Seventy-eight percent of teachers believed speaking English at home would facilitate English acquisition for
ELLs. Additionally, results of the questionnaire indicated that 49% of teachers believed there was a place for the use of native languages in their classrooms. 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. Only 9% of teachers believed that it is not their responsibility to bring ELLs up to the same level as other students mathematically.

**Research Question 2:**

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

To answer this question, a one-way ANOVAs and a crosstab were conducted to determine if having training in teaching ELLs affected the teachers’ beliefs and actions about strategies to help ELLs.

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 2). 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 2).
Table 2

Means of Teacher Strategy Variables against Training Received

<table>
<thead>
<tr>
<th>Questionnaire Items Related to Strategies</th>
<th>Training Received&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Training Not Received&lt;sup&gt;b&lt;/sup&gt;</th>
<th>p value</th>
<th>Eta squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>I use differentiation to meet the needs of the ESOL students in my classes.</td>
<td>4.20</td>
<td>3.67</td>
<td>.001</td>
<td>.115</td>
</tr>
<tr>
<td>I use collaborative learning to meet the needs of the ESOL students in the classes.</td>
<td>3.98</td>
<td>4.02</td>
<td>&gt; .05</td>
<td></td>
</tr>
<tr>
<td>ESOL students are best taught using direct instruction/lecture to the entire class.</td>
<td>2.35</td>
<td>2.42</td>
<td>&gt; .05</td>
<td></td>
</tr>
</tbody>
</table>

Note. N ranged from 87 to 91.

<sup>a</sup>n ranged from 45 to 46. <sup>b</sup>n ranged from 42 to 45.
Table 3

*Frequency of Modifying Assignments (Collapsed) by Training Received*

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

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

$p < .01$. 
In addition, having received training in the area of teaching ELLs was significantly related to the frequency of modifying assignments (See Table 3). 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. Only 5% strongly agreed or agreed that ELLs were best taught using direct instruction. 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 to 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.

The participants had mixed views on assessing ELLs. 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. Similarly, a little over half (52%) of the teachers agreed or strongly agreed that ELLs should not be graded on work they cannot read, while 20% disagreed or strongly disagreed. In addition, 56% strongly agreed or agreed that ELLs can show understanding on a few exercises, rather than be given the whole assignment. In addition, a decisive majority (70%) believed that teachers should modify assignments for ELLs, and 82% thought it is good practice to allow ELLs additional time to complete assignments.

Although 84% of respondents strongly disagreed or disagreed that it is unfair to make modifications for ELLs, teachers reported actually modifying their assignments at
varying rates. For example, 39% reported modifying assignments almost every day or every day, while 19% reported never modifying their assignments.

**Research Question 3:**

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

Findings from the survey showed that only 25% of the teachers felt they were well prepared. In addition, 74% of teachers would like to receive more training to help ELLs.

It appears that when teachers had what they need to teach ELLs, they had a more positive attitude toward ELLs in their classrooms. For example, three correlations that were related to professional development and resources 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 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 hours with a mean of 13.43 hours. Specifically, 82% of these respondents 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 had ELLs in their class, 43% of them reported regularly speaking with the ESOL teacher. The data indicated that 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. Fortunately, these teachers were willing to learn more about educating ELLs. Specifically, 74% answered that they would like to receive more professional development in teaching ELLs.

Two factors were found to make significant difference on teachers’ beliefs; the most notable differences were between those who had received training in teaching ELLs and those who had not. Also, the data indicated that females believed significantly more than males that teachers should modify assignments for ELLs.
To summarize the qualitative results, also published elsewhere by Author (2013), the teachers reported lack of time as being a challenge to meeting the needs of ELLs. Teachers also responded that they believed ELLs have difficulties with the amount of reading, word problems, and specialized vocabulary in mathematics classrooms. During interviews, the ELL students reported having difficulties in mathematics class because of the number of word problems and words they could not understand. They also desired more materials in their native language and more time to complete assignments.

**Discussion**

The questionnaire data indicated many teachers are optimistic about teaching ELLs and they overwhelmingly believed that ELLs could master the required curriculum when given proper support. However, over half believe that ELLs should not be in regular education classes until they attain a minimum level of English proficiency. Teaching mathematics to ELLs is a concern for the majority of these questionnaire respondents.

The questionnaire data indicated that over half of the teachers are not confident in their ability to teach ELLs or to adapt their instruction to meet the needs of ELLs. 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 responding to the questionnaire accepted as true that speaking English at home is desirable, when in fact, the loss of proficiency in the native language breaks down communication with family members and lowers self esteem (Lee & Oxelson, 2006; Tannenbaum & Howie, 2002).
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. Perhaps this is related to the fact that only 23% of the teachers in the present study reported they have the resources they feel they need to meet the needs of the ELLs in their classrooms. However, teachers who had training in teaching ELLs used differentiation and modified assignments significantly more than those without training.

Researchers (Reeves, 2006 & Walker, Shafer, & Iams, 2004) have had similar findings to the ones in this study that many teachers do not believe it is fair to make accommodations for ELLs. This idea certainly is contrary to what we know as best practices in any field of education, so it is alarming to consider possible reasons for these negative beliefs toward ELLs in particular. In-depth interviews could provide more information related to why these beliefs exist.

Limitations

One limitation is the format and data collection using a questionnaire. 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). Another potential limitation in this study is that teachers’ self-reported beliefs may not indicate their actual behavior in the classroom.

Implications for Middle School Mathematics Teachers
This study has specific implications for mathematics teachers of ELLs. 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. 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. Fewer than half the teachers in this study agreed that they regularly speak with the ESOL teacher at their school.

**Recommendations for Professional Development**

Multiple researchers have provided suggestions regarding professional development for teachers of ELLs. For example, Ryan (1995) writes that the fact that culture is inseparable from language needs to be taught and put into practice. 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). Godley, Sweetland, Wheeler, Minnici, and Carpenter (2006) state, “only relevant information anchored in practice is likely to affect teacher practice significantly” (p. 33) because teachers will disregard information that doesn’t seem to apply to them. In summary, “teachers must have opportunities to gain specialized skills to work
effectively with ESL students; otherwise, mainstreaming is not a positive solution” (Young, 1996, p. 18).

The data in this study also suggest a need for increased professional development for 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. For example, 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. This finding is in contrast to previous researchers whose participants were not open to professional development in working with ELLs (Clair, 1995; Gandara et al., 2005; Reeves, 2006; Walker et al., 2004). Results from the questionnaire indicated that teachers with training believed they could adapt their instruction to meet the needs of ELLs significantly more than those without training.

As ESOL programs continue to move toward inclusion, this issue will increase in importance. This study supports an earlier finding (Author, 2011a), that a “poverty of language learning” exists in U.S. teacher education meaning that many certified teachers are lacking the necessary skills and knowledge of second language acquisition to be successful teachers of ELLs. The teachers in the present 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. These results support Author’s
(2011a) conclusions that teachers need to adopt the following “beliefs for the successful inclusion of ELLs listed previously.

**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. No articles that I found examined mathematics teachers in middle schools specifically. Additionally, this study utilized a new questionnaire: “Mathematics Teachers’ Beliefs about English Language Learners Questionnaire.” As such, this study presents 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, but the questionnaire needs to be validated. Shortening the length of the questionnaire, or breaking it down into more than one instrument may encourage a larger response rate.

Additionally, 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 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.

Finally, beyond replication of this study, there is a need to complete studies to further examine teachers’ beliefs about ELLs. Additional data could be gained by using a qualitative approach. For example, more detailed information about ELLs’ experiences would help to
strengthen this body of research. Also, the term “strategy” was defined in a broad way in this study as seen in Table 2 with the approaches to classroom organization. More specific examples of techniques such as vocabulary instruction or Total Physical Response (TPR) could be examined. More in-depth interviews with teachers could help us understand how teachers actually viewed terms used in the questionnaire such as “collaborative learning” or “differentiation.”

Additionally, observational data are necessary to examine what is actually happening in mainstream, mathematics classrooms with 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?
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