Sheltered Instruction versus Mainstream Classroom – The Impact of Classroom Placement and Other Factors on the Achievement of English Language Learners in Science: Implications for Educational Leaders

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ABSTRACT

EDUCATIONAL LEADERSHIP

MAGEE, ARIANA T. B.S. DILLARD UNIVERSITY, 2002
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SHELTERED INSTRUCTION VERSUS MAINSTREAM CLASSROOM - THE
IMPACT OF CLASSROOM PLACEMENT AND OTHER FACTORS ON THE
ACHIEVEMENT OF ENGLISH LANGUAGE LEARNERS IN SCIENCE:
IMPLICATIONS FOR EDUCATIONAL LEADERS

Committee Chair: Sheila T. Gregory, Ph.D.
Dissertation dated May 2017

The purpose of this study was to examine 9th and 10th grade ELL students’ science class placement - sheltered ESL class or non-sheltered mainstream class - and determine if there was a difference in their levels of achievement based on placement. Unlike other academic courses, science incorporates its own terminology that can be difficult for even mainstream non-ELLs to understand. With the goal for English Language Learners to develop scientific proficiency, ELLs must gain an understanding of science substance and practice exploratory propensities for the brain. This is unthinkable without an understanding of science vocabulary.

The researcher examined the following variables as they related to ELL student achievement in science: Cognitive Academic Language Proficiency (CALP), attendance, class size, teacher-student relationship, teacher competency in ELL strategies,
instructional strategies, parental involvement, study habits, immigration requirements, age (demographic variable), and gender (demographic variable). Data were gathered using observations, face-to-face teacher and administrator interviews, document analyses of teacher lesson plans, a student survey, and a student focus group.

The sample of students consisted of 30 students - 9 students in mainstream science classes and 21 students in sheltered ESL science classes. Students were chosen to participate in the study based on their Assessing Comprehension and Communication in English State-to-State (ACCESS) scores. Study participants had a composite score between 3.0 and 4.9 on the ACCESS test. Study participants’ nine weeks grades, along with other data, were compared to determine if class placement made a significant difference in ELL student achievement in science.

The results revealed that students in sheltered ESL science classes achieve at higher levels than those in mainstream classes. While all except two study participants in sheltered science classes met or exceeded proficient as defined by this study (75% or higher), only three study participants in mainstream science classes met or exceeded proficient. An analysis of students’ overall nine weeks grades in biology and physical science revealed that ELLs in a sheltered setting average a 45% higher grade than those in a mainstream setting in biology and a 14% higher grade than those in a mainstream setting in physical science.
SHELTERED INSTRUCTION VERSUS MAINSTREAM CLASSROOM - THE IMPACT OF CLASSROOM PLACEMENT AND OTHER FACTORS ON THE ACHIEVEMENT OF ENGLISH LANGUAGE LEARNERS IN SCIENCE: IMPLICATIONS FOR EDUCATIONAL LEADERS

A DISSERTATION
SUBMITTED TO THE FACULTY OF CLARK ATLANTA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF EDUCATION

BY
ARIANA TINA MAGEE

DEPARTMENT OF EDUCATIONAL LEADERSHIP

ATLANTA, GEORGIA

MAY 2017
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Words cannot express the gratitude that I feel for the many individuals that have helped and encouraged me along my journey towards earning my doctoral degree in Educational Leadership. First, I would like to thank my biggest supporters and cheerleaders, my parents, Mr. and Mrs. Larry Magee. Throughout my life, they have always encouraged me to pursue my dreams and to be the best that I could be. My mother, Donies Magee, instilled in me the love of education and teaching. She taught me that education is the key to success and to never stop learning. My father gave me the will to be a hard worker. His willingness to make sacrifices to provide for my sister and me is something for which I could never repay him. Earning this degree in honor of my parents only scratches the surface of my gratitude to my parents. Next, I would like to thank my best friend, my sister, Ayanna Brown, who gave me the strength and courage to continue my journey when the road became rough. Third, I want to extend a huge thank you to my advisors and professors at Clark Atlanta University - Dr. Sheila Gregory, Dr. Barbara Hill, Dr. Darryl Groves, and Dr. Trevor Turner. Often, they saw things in me that I did not see in myself and encouraged me to step outside of my comfort zone to become a better educator. Lastly, my quest would be impossible if it were not for God. As director of my life, he receives my highest praise and thanks.
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CHAPTER I

INTRODUCTION

The face of public education is rapidly changing. The demographics of classrooms are becoming increasingly more culturally diverse. Classroom demographics are shifting from predominantly native English speaking students to mostly English language learners. However, teacher demographics have remained the same (Dilworth & Coleman, 2014). Most American teachers are monolingual, speaking only English. While teacher preparation programs do an excellent job of offering strategies of how to best teach English language learner students, nothing can prepare educators to deal with the struggles of secondary ESL education.

Over the past 10 years, the number of English Language Learners in the United States has steadily increased. According to the National Center for Education Statistics’ (NCES) The Condition of Education 2015 Report,

The percentage of public school students in the United States who were English language learners was higher in school year 2012–13 (9.2 percent, or an estimated 4.4 million students) than in 2002–03 (8.7 percent, or an estimated 4.1 million students) and in 2011–12 (9.1 percent or an estimated 4.4 million students).

(p. 84)

While classroom demographics are changing, teacher demographics are not. According to the National Education Association’s 2014 report titled “Time for Change: Diversity
Teaching Revisited, only “18% of the PK-12 teaching corps are people of color and, as research shows, far too many educators, regardless of background, struggle to comprehend and employ the tenets of culturally responsive practice” (Dilworth & Coleman, 2014, p. 1). Though they may take a class on teaching English Language Learners, many of these teachers’ first experience in a multicultural setting is their first day of work. Being placed in an unfamiliar situation, these teachers panic and have trouble finding ways to relate to and educate the students. Moreover, while some say that bilingual education is the answer, there is a serious shortage of teachers who hold bilingual credentials and certificates. In their 1994 article published in The Journal of Educational Issues of Language Minority Students, Lynn Diaz-Rico and Jerilynn Smith found that only 7,775 classroom teachers hold bilingual credentials, which was more than 12,000 short of the 19,500 bilingual education teachers needed. The article predicted, “by the year 2000, [language and ethnic] minorities will account for only 5% of public school teachers” (Diaz-Rico & Smith, 1994, p. 256).

In sharp contrast to elementary ESL education, secondary ESL education does not readily lend itself to successfully teaching academic English to ELL students. Elementary education, though based on standards, allows teachers flexibility in that classes are mostly self-contained. Students spend a majority of their school day with the same teacher, giving the teacher and students ample time to learn to communicate with each other. Moreover, ELLs entering schools during their formative (elementary) years have an advantage over those entering at a later stage. Because a younger brain is significantly more active than an older brain, the elementary years are the perfect time for acquiring a
second language. This increased activity fosters connections between neurons in the brain, yielding enhanced proficiency. It is significantly easier for those who acquire a new language before the age of 10 to attain native fluency than those who begin to learn at later ages (Naserdeen, 2001). Because they are still mentally developing and have not yet developed a full understanding of their native language, schooling readily lends itself to these ELLs achieving the same levels of Cognitive Academic Language Proficiency as native non-ELLs by time they enter high school.

Secondary education is content specific, meaning that teachers are only trained to teach their particular subject. For this reason, students only spent an hour and a half at most with their teachers daily, which makes it difficult for teachers and students to learn to communicate with each other. Secondary teachers are expected to teach standards that are specific to their content area, which benchmark and state tests are based on. These tests are only administered in English. For a struggling ELL student, a benchmark or state test in English could be intimidating and detrimental.

The struggles of ELLs are especially prevalent in science courses. Unlike other academic courses, science incorporates its own terminology that can be difficult for even mainstream non-ELLs to understand. Taking in the dialect of science and the vocabulary of science introduces different difficulties for ELLs. The dialect and ideas of science are regularly theoretical. This level of deliberation goes outside the ability to comprehend with individual vocabulary words. It is implanted in the essential linguistic structure of sentences, the dialect capacities associated with science, and the patterns of discourse of science. In science, words found in students’ daily conversational English vocabulary
have distinctly different scientific meanings. For example, in biology, the word class refers to a level of classification of organisms. In conversation, class refers to a room in the school. In physical science, work refers to the force required to move an object. In conversation, it refers to what one does to earn money. With the goal for English Language Learners to develop scientific proficiency, ELLs must gain an understanding of science substance and practice exploratory propensities for the brain. This is unthinkable without an understanding of science vocabulary (Giouroukakis & Rauch, 2010).

English Language Learner class placement models fall into two categories: the English-only model and the bilingual model. With the English-only model, students only receive instruction in English. While ELLs, may receive support in their native language from teachers’ aides, the use of an ELL’s native language is significantly diminished. English-only models, which are commonly known as ESL (English as a Second Language) programs and include sheltered instruction and structured immersion, work best for student populations consisting of multiple language backgrounds. With the bilingual model, ELLs receive instruction in both English and their native language. There are two types of bilingual programs—dual language and transitional bilingual programs. The dual language program develops students’ skills in both English and their native language and can serve both ELLs and non-ELLs. In both student populations, the dual language program strives to foster the development of a new language—for ELLs that language is English and for non-ELLs it is another language (Spanish, French, Chinese, etc.). Such a program allows ELLs to maintain their cultural identity while developing academic and language proficiency in English. The transitional bilingual
program uses students’ native language to build skills in English. As students’ English proficiency increases, the use of the native language gradually tapers off (Moughamian, Rivera, & Francis, 2009).

ELLs can also benefit from technology driven instruction. Computer Assisted Language Learning (CALL) uses technology to enhance an ELL’s learning and comprehension of English. CALL has been seen as regularly taking into consideration more noteworthy learner autonomy and student decision in the terms of pace, substance, enthusiasm, learning style and medium. Coordinating CALL into second dialect direction, especially for students who may have been generally underestimated (e.g. English Language Learners) has been seen as giving more prominent chance for equity. The utilization of technology in the classroom can provide ELLs with numerous avenues for the improvement of language. Adequately connected, language-learning exercises incorporated with the technology can provide students with the opportunity to comprehend meaning – a key guideline in second language acquisition (New York State Education Department, 2010).

Communication is the key to insuring that all students achieve at high levels. However, for ELLs, this key is missing from their education. From the teacher perspective, teachers are given the task of educating students and increasing their proficiency levels. In a mainstream (non-ESL) class setting, this task is sometimes difficult. In order to effectively teach students, teachers must first get to know their students, learn how to communicate with them, and earn their hearts/trust. This task is even more difficult in an ESL setting because the teacher often does not speak the
language of her students. The teacher must rely on strategies and research in order to learn how to effectively communicate with the students. What compounds this task is the fact that ELLs, even though they are at a greater deficiency academically than their native English-speaking counterparts, are expected to meet the same academic standards.

From the secondary ELL student perspective, these students are new to the country. Some have experienced learning in their native country, while others have not. Nonetheless, they are placed in a situation in which they must adapt to a new way of learning in a new language with a teacher who may not know or understand how to effectively communicate with them. While they understand that education is key to being successful in the United States, there are still cultural barriers that hinder their progress in American schools.

The school district chosen for this study assesses students’ language proficiency using the World-Class Instructional Design and Assessment (WIDA) Consortium’s WIDA-ACCESS Placement Test (W-APT). The test assesses ELL students in six domains, including reading, comprehension, speaking, and writing. Students are scored on a scale from one to six as shown in Table 1.

When ELL students come to the district, they are given the W-APT. If they score 1.9 or below, they are placed in the International Student Center, where they receive intensive English instruction. Students can stay at the International Center for up to six months or one semester.
<table>
<thead>
<tr>
<th>6 - Reaching</th>
<th>5 - Bridging</th>
<th>4 - Expanding</th>
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<tbody>
<tr>
<td>Particular or specialized dialect of the content at grade level</td>
<td>Particular or specialized dialect of the content areas</td>
<td>Particular and some specialized dialect of the content areas</td>
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<tr>
<td>An assortment of sentence lengths of fluctuating linguistic complexity in developed oral or written as required by the predefined grade level</td>
<td>An assortment of sentence lengths of fluctuating linguistic complexity in extended oral or written discourse, including stories, essays, or reports</td>
<td>An assortment of sentence lengths of fluctuating linguistic complexity in oral discourse or multiple, related sentences or paragraphs</td>
</tr>
<tr>
<td>Oral or composed correspondence in English practically identical to capable English peers</td>
<td>Oral or composed correspondence approaching comparability to that of English-proficient peers when presented with grade-level material</td>
<td>Oral or composed correspondence with minimal phonological, syntactic, or semantic errors that do not obstruct the general significance of the correspondence when given oral or composed joined talk with tangible, realistic, or intuitive backing</td>
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<th>3 - Developing</th>
<th>2 - Emerging</th>
<th>1 - Entering</th>
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<tbody>
<tr>
<td>General and some particular language of the content areas</td>
<td>General language related to the content areas</td>
<td>Pictorial or realistic representation of the dialect of the content areas</td>
</tr>
<tr>
<td>Extended sentences in oral association or composed sections</td>
<td>Phrases or short sentences</td>
<td>Words, phrases, or chunks of language when presented with one-step commands, directions, choice, or yes/no questions, or statements with sensory, graphic, or interactive support</td>
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<th>3 - Developing</th>
<th>2 – Emerging</th>
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<tbody>
<tr>
<td>Oral or composed dialect with phonological, syntactic, or semantic blunders that may obstruct the correspondence, however hold quite a bit of its importance, when given oral or composed, account, or informative depictions with tangible, realistic, or intelligent backing</td>
<td>Oral or composed dialect with phonological, syntactic, or semantic blunders that often obstruct the meaning of the correspondence when presented with one to multiple-step commands, directions, questions, or a series of statements with sensory, graphic, or interactive support</td>
<td>Oral dialect with phonological, syntactic, or semantic blunders that generally obstruct meaning when given fundamental oral charges, direct inquiries, or straightforward proclamation with tactile, realistic or intuitive backing</td>
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Upon exiting the International Center, students take the W-APT again and are placed at their neighborhood schools in classes based on those scores. For those who score between 2 and 4.9, they are placed in a combination of general classes and ESL classes. Students scoring above 5 are placed in general classes (School District, 2013).

Once students get to their neighborhood schools, they are further assessed and placed in three different tiers based on language proficiency. Tier A consists of ELLs who have arrived in the U.S. or entered school in the U.S. within this academic school year without previous instruction in English, currently receive literacy instruction only in their native language, or have recently tested at the lowest level of English language proficiency. Tier B consists of ELLs who have social language proficiency and some, but not extensive, academic language proficiency in English, or have acquired some literacy in English though have not yet reached grade level literacy. Tier C consists ELLs who are approaching grade level in literacy and academic language proficiency in the core content.
areas, or will likely meet the state’s exit criteria for support services by the end of the academic year (World Class Instruction Design and Assessment, 2013).

**Statement of the Problem**

Historically, most secondary ELL students enter their classrooms at a greater deficiency than their native English-speaking counterparts. While most assume that transitioning into learning in English is simply a matter of language acquisition, this is generally not the case. “ELL students are faced with the challenge of acquiring oral and academic English while keeping pace with their native English speaking counterparts” (Bardack, 2010, p. 4). Generally, oral proficiency can take between 3 and 5 years to develop, while academic English proficiency can take between 4 and 7 years after oral proficiency has developed. When these older ELLs enter secondary education programs, the ideal setting would be a bilingual classroom in which students are taught in both languages. This setting would be the most beneficial in insuring that ELLs achieve at the same levels as their native English-speaking counterparts (Bardack, 2010). However, most schools do not have the human or financial resources to have such a program. In reality, ELLs are essentially thrown into classes in which they are forced to learn and be proficient in a language they have difficulty understanding. The pressure of both learning to effectively communicate and successfully matriculate through school using English is immensely intense for secondary ELLs who have come to the United States later in their educational careers. As a result, ELLs are twice as likely to dropout prior to earning a high school diploma than native and fluent English speakers (Callahan, 2013).
In terms of science classes, ELLs at the school chosen for this study who score between 2 and 4.9 on the ACCESS test should be placed in sheltered ESL science class. However, often times, due to scheduling conflicts, ELLs are placed in general non-ESL science classes. While some are able to adapt to the environment and achieve at the same levels as their non-ELL peers, some find it difficult to understand the language of science and to comprehend the scientific concepts.

**Purpose of the Study**

The purpose of this study was to examine 9th and 10th grade ELL students’ science class placement—sheltered ESL class or non-sheltered mainstream class—to determine if there is a difference in their levels of achievement based on placement. Also, if there was a difference, the researcher determined which environment was the most promising for ELL students. The researcher also examined the following variables as they relate to ELL student achievement in science:

- Cognitive Academic Language Proficiency (CALP)
- Attendance
- Class Size
- Teacher-Student Relationship
- Teacher Competency in ELL Strategies
- Instructional Strategies
- Parental Involvement
- Study Habits
- Immigration Requirements
• Age (demographic variable)
• Gender (demographic variable)

The study is intended to be used as a tool for education professionals (teachers and administrators) to explore how to best meet the needs of ELL students through placement in the most conducive learning environment.

**Research Questions**

RQ1: How does classroom placement—mainstream non-ESL class versus sheltered ESL class—affect ELL student achievement in science?

RQ2: How does a student’s level of cognitive academic language proficiency (CALP) affect ELL student achievement in science?

RQ3: How does attendance affect ELL student achievement in science?

RQ4: How does class size affect ELL student achievement in science?

RQ5: How does a student’s relationship with their teacher affect ELL student achievement in science?

RQ6: How does the teacher’s competency in ELL strategies in the science curriculum content affect ELL student achievement in science?

RQ7: How do instructional strategies affect ELL student achievement in science?

RQ8: How does parental involvement affect ELL student achievement in science?

RQ9: How do study habits affect ELL student achievement in science?
RQ10: How do immigration requirements (court dates, meetings, etc.) affect ELL student achievement in science?

RQ11: How does a student’s age affect ELL student achievement in science?

RQ12: How does gender affect ELL student achievement in science?

Significance of the Study

The school chosen to complete this study’s student population is composed of 31.6 percent students with limited English proficiency (School District Data, 2014). Research has shown that ELLs are twice as likely to dropout of school before attaining a high school diploma than native and fluent English speaking students (Callahan, 2013). Not earning a high school diploma makes it almost impossible for these students to become successful in life. According to a study conducted by Northeastern University in Boston, in 2008, the average jobless rate of individuals who did not earn a high school diploma was 54%. This rate was 22 points below high school graduates, 33 points below those who completed 1-3 years of post-secondary schooling, and 41 points below those who earned a bachelors’ degree (Sum, Khatiwada, & McLaughlin, 2009). Moreover, high school dropouts annually earn $9,200 less than those who complete high school. Over a lifetime, this amounts to $375,000 less than high school graduates and $1 million less than college graduates (Burrus & Roberts, 2012). Something as simple as proper classroom placement can drastically reduce the chances that an ELL will dropout. In a supportive environment that is conducive to learning, ELLs, regardless of level of English language proficiency, can flourish. The cohort graduation rate accounts for a significant portion of a school’s College and Career Readiness Index rating; placing
ELLs in the most academically conducive classroom setting will ensure that the cohort graduation rate does not decrease.

**Summary**

While there is lots of research that exists on the topic of ELL education, most current research focuses on younger ELLs. Because secondary education is content based, studies of secondary ESL education generally talk about the difficulties faced, but provide no solutions to issues, such as class placement, that exist in secondary ESL education. In her 2001 report presented at the Mid-TESOL annual conference, Deqi Zen detailed the plight of several Chinese immigrant students. Zen herself was a Chinese immigrant. In her experience with education in the United States, she had no significant downfalls or issues. It was not until she became a teacher herself that she noticed the disparities in secondary ESL education. While the report reveals the many pitfalls and disparities that exist in ESL education, it offers no solutions (Zen, 2001).
CHAPTER II
LITERATURE REVIEW

Introduction

While there is a plethora of research regarding the academic achievement of younger elementary aged English Language Learners, very little exists concerning that of older high school aged ELLs. Because subjects like science and social studies are not considered important by governing education boards, most studies that are in existence for secondary ELLs focus mainly on English and math:

- *English Language Learners and Math Achievement: A Study of Opportunity to Learn and Language Accommodation* (Abedi, Courtney, Leon, Kao, & Azzam, 2006)

- *Closing the Gap in Mathematics of Non-English Language Learners and English Language Learners in the United States* (Hanten, 2012)

- *A Study of an Online Reading Intervention for Secondary English Language Learners* (Colina, Leavell, Cuellar, Hollier, & Episcopo, 2009)

- *Effective Reading Programs for English Language Learners: A Best-Evidence Synthesis* (Slavin & Cheung, 2003)

Many factors contribute to the academic achievement of ELLs in science. This study sought to examine how those factors contribute to ELL student achievement in science.
This study’s motivation was to look at ELL class placement in science to determine whether there is a distinction in their levels of academic achievement due to placement. If there is a distinction, this study aimed to discover which environment is the most conducive for increasing the achievement of ELL students. In this section, the researcher examined the independent variables as they relate to the dependent variable—ELL student achievement in science, as measured by semester course grades.

**Class Placement**

Sheltered instruction is an instructional approach used to make academic instruction in English understandable to Limited English Proficient (LEP) students. Students in these classes are “sheltered” in that they do not compete academically with native English speakers since the class includes only LEP students. In the general classroom, English fluency is assumed. In contrast, in the sheltered English classroom, teachers use physical activities, visual aids, and the environment to teach important new words for concept development in mathematics, science, history, home economics, and other subjects (Freeman & Freeman, 1988).

The methods that teachers employ in sheltered classes include the following: extra linguistic cues such as visuals, props, and body language; linguistic modifications such as repetition and pauses during speech; interactive lectures with frequent comprehension checks; cooperative learning strategies; focus on central concepts rather than on details by using a thematic approach; and development of reading strategies such as mapping and writing to develop thinking (Freeman & Freeman, 1988).
In most shelter instruction environments, teachers use the strategies and methods of the Sheltered Instruction Observation Protocol (SIOP). According to Echevarria and Vogt’s (2010) article in the *New England Reading Association Journal*, when used on a consistent basis, the SIOP model can significantly improve literacy for English learners. The model includes six principles of instruction that foster engagement for English learners: multiple opportunities for ELLs to contribute linguistically to the lesson, connections to ELL’s past experiences and prior learning throughout the lesson, explicit vocabulary instruction, lessons that are meaningful and accessible to ELLs, opportunities to demonstrate what they have learned, and assessment driven instruction (Echevarria & Vogt, 2010).

The article also mentioned that among the myriad of reasons the ELLs lose interest in school, the most significant reason is the type of instruction they receive in class. ELLs need culturally sensitive/respectful instruction that allows them to develop positive relationships with other students as well as the teacher. When ELLs feel valued in the classroom, they are less likely to drop out and more likely to be successful (Echevarria & Vogt, 2010).

While ELLs are typically educated in sheltered settings, they can also be educated in bilingual classrooms. A 2014 study published in the *Learning Environments Research Journal* focused on the differences in achievement between ELLs in Structured English Immersion (SEI) science classes and bilingual science classes. The study found that although states are moving away from the bilingual instruction model, Hispanic students typically performed better on science assessments when they were in bilingual...
classrooms. Proponents of bilingual education state that instruction in both the native language and in English facilitates faster academic proficiency in English. It is thought that once a student learns something in their native language, it can be readily transferred to English. Proponents of SEI claim that because many different languages can exist in the same classroom, bilingual education is not the best option (McEneaney, Lopez, & Nieswandt, 2014).

The study examined the science scores of fourth grade students in states with a strong emphasis on bilingual education (Colorado, Florida, Wisconsin, Texas, and New Mexico) and states with a strong emphasis on SEI (California, Arizona, Nevada). For Hispanic ELLs, states with a strong emphasis on SEI had lower mean composite scores than those with a strong emphasis on bilingual education. However, with immigrants entering the U.S. each day from various parts of the world speaking a variety of different languages, this model would not work in most sheltered classrooms (McEneaney, Lopez, & Nieswandt, 2014).

**Cognitive Academic Language Proficiency**

While there are numerous theories of language acquisition, none are more applicable to this study than those of Jim Cummins (Contextual Interaction Theory) and Lily Wong Fillmore and Catherine Snow (Domains of Teacher Knowledge for Second Language Theory).

Cummins’ theory focuses on the difference between Basic Interpersonal Communication Skills (BICS) and Cognitive Academic Language Proficiency (CALP). The theory states that there is great distinction between a student’s everyday language
and academic language. Often times, ELL students are proficient in BICS, but struggle with CALP (Stewart, 2010). Cummins’ five principles for the education ELL students are:

1. Proficiency in L1 and L2 are positively associated with academic achievement. If a student is achieving in L1, then that student is more likely to achieve in L2.

2. Proficiency means being able to both communicate academically and socially.

3. The development of the primary language skills necessary to complete academic tasks forms the basis of similar proficiency in English.

4. Acquisition of basic communicative competency in a second language is a function of comprehensible second language input and a supportive affective environment.

5. Teachers must believe that students can achieve. Student outcomes are affected by teacher perceptions. (Lavadenz, 2011)

Cummins’ theory divides language acquisition into two periods—learning basic communication skills and learning academic English. Learning basic communication skills generally takes students between two and five years; the length of time varies dependent on how much schooling the student has had in their native country. It will take those who have never attended school or have limited schooling longer to become proficient in BICS. Moreover, achievement directly correlates with the development of CALP. CALP also depends on the level of school the student received in their native country. Those who were academically proficient in their native countries will become
proficient in the United States relatively quickly compared to those who were not academically proficient (Lavadenz, 2011).

According to Fillmore and Snow (2000), teachers are an integral part of second language development in ELL students. In reference to helping ELL students to achieve, teachers must play the following roles:

1. **Teacher as communicator** – to communicate effectively, teachers must know how to structure their own language output for maximum clarity and have strategies for understanding what students are saying (Fillmore & Snow, 2000).

2. **Teacher as educator** – in order to teach effectively, teachers must plan instruction based on knowledge of English language acquisition, content, and the cultural backgrounds and needs of students (Fillmore & Snow, 2000).

3. **Teacher as evaluator** – to guide the planning of lessons, teachers must assess and determine students’ levels of language and academic proficiency and use strategic grouping to insure all students achieve (Lavadenz, 2011).

4. **Teacher as an educated human being** – in order to best assist ELLs in learning oral and academic English, teachers must be knowledgeable of basic English linguistics and sociopolitical factors that influence academic achievement for diverse learners (Lavadenz, 2011).

5. **Teacher as agent of socialization** – using the knowledge and cultural traditions/beliefs students bring to school from home, teachers must build on
what students know and help them to understand the culture, language, and traditions of the United States (Fillmore & Snow, 2000).

In the secondary ESL classroom, students must learn both oral and academic English. Cummins’ theory states that communication is key to achievement in the classroom; learning to understand and properly use the new language takes time. However, despite language acquisition being a gradual process, secondary ESL students must still meet the same rigorous academic goals of their native English-speaking counterparts. Though ELLs may quickly develop BICS, it may take significantly longer for them to develop cognitive academic language proficiency (CALP).

**Attendance**

In order for an ELL to develop CALP, they must attend school on a general and constant basis. According to the School District’s code of student conduct, students must not accrue more than 8 or more unexcused absences during a school year. Once a student reaches 8 or more absences, that student must be referred to the school social worker and is in danger of being retained (School District, 2015).

Existing research supports the notion that students must attend school generally in order to be successful. According to Cole’s (2011) article published in the *Georgia School Counselor’s Association Journal*, truant students might experience issues meeting the graduation requirements. As instructors endeavor to expand scholastics, the more imperative attendance gets to be. With shifts in instruction to more student-centered and hands-on activities, it is more important than ever that students attend school (Cole, 2011).
Students fail to attend school for various reasons, including familial obligations, personal reasons (drug and alcohol abuse, self-esteem, behavior problems, etc.), and lack of school rapport. While nothing can be done how outside factors influence attendance, students can be offered incentives for attending school generally. The program investigated in this study used a daily check-in system and tracked the attendance of 10 culturally diverse elementary students in a metro Atlanta school for six weeks. According to the students, the incentives motivated them to come to school. Prior to implementing this program, participants averaged 8.8 absences. At the conclusion of the program, these same students averaged 1.7 absences. Teachers found the program effective in that the increased seat time allowed them to readily address any deficiencies in learning these students. Although the study offered no specific numbers, 60% of the teachers found the program extremely effective in increasing student achievement by decreasing student absenteeism (Cole, 2011).

Before conducting their study on the effects of chronic absenteeism from school on high school students, Paredes and Ugarte (2011) reviewed literature from several other attendance studies. In their examination of the relationship between attendance and several other variables, Epstein and Sheldon (2002, cited in Paredes & Ugrate, 2011) found that was a negative correlation between attendance and the socioeconomic status of students. Another study, conducted by Ryan, Adams, and Dalicandro (1998, cited in Paredes & Ugrate, 2911) further concluded that,

Students who are frequently absent from school had low self-esteem, were less competent in their social relations, perceived less cohesion in their families, felt
less parental acceptance, had inconsistent discipline, and indicated less satisfaction regarding school characteristics and personnel. (p. 194)

However, Daugherty’s study (2008, cited in Paredes & Ugarte, 2011) which held the most significance to Paredes and Ugarte’s study, found that under controlled conditions (gender, ethnicity, socioeconomic status), higher rates of absenteeism reduced academic achievement.

For their study, which was conducted using the math scores on a standardized test of 10th grade students in Chile, Paredes and Ugarte compared student absenteeism to student math scores on the end of course test. The test was administered at the end of the school year. The study found that “a student who missed 9 days during the year reduced his or her performance by 18% of the standard deviation of the SIMCE mathematics test” (Paredes & Ugarte, 2011, p. 198).

Class Size

There is a plethora of research surrounding the area of class size as it relates to student achievement. Numerous studies have found that smaller class sizes allow teachers to give students more individualized attention and better meet the needs of every learner. Recognizing this notion, for the 2015-2016 school year, the School District set class size limits for general core subject area (ELA, math, science, social studies) secondary classes at 36 students. For secondary ESL core classes, this number is only 22, which is significantly lower.

While no research exists that specifically addresses class size as it relates to ELL student achievement in science, there are studies related to science class size and student
achievement as well as overall class size and student achievement. A 2007 study published in *The High School Journal* found that secondary science class directly correlates to student performance in college science classes (Wyss, Tai, & Sadler, 2007). Proponents of reduced class sizes report that smaller classes lead to better instructing and more compelling learning. Benefits include better behavior management, targeted instruction, more individual consideration and opportunity for participation for students. This study examined two notions: do teaching methods change as class sizes get larger? Is the size of secondary science classes connected with higher student accomplishment in higher education science classes? (Wyss, Tai, & Sadler, 2007)

To answer the first question, the researchers surveyed high school science students in the frequencies of instructional practices in their classes. Class sizes surveyed, ranging from less than 10 students to more than 30 students were divided into six categories: 10 or fewer, 11-15, 16-20, 21-25, 26-30, and more than 30 students. The study found that as class sizes increased, teachers generally changed the methods in which instruction was presented. Larger classes reported greater frequencies of lecturing and less hands-on/individualized work, while smaller classes reported more whole class discussions, peer tutoring, and group and individual work. Both extremes reported similar frequencies of demonstrations (Wyss, Tai, & Sadler, 2007).

For the second question, the researchers again categorized students based on the size of their high school science classes. Using the same six groupings, the researchers examined these students’ final grades in introductory college science courses. An analysis of their grades revealed that students who were in high school science classes containing
10 or fewer students performed significantly better than those who were in smaller classes. The difference amounted to 1.42 points or 1/6th of a letter grade. Results from both research questions suggest that class size reductions have a significant impact on student achievement, especially in science classes (Wyss, Tai, & Sadler, 2007).

Moreover, Shin and Chung’s (2009) meta-analysis of 17 class size studies found similar results as it relates to science class size. The study examined the results of 17 class size studies, 8 of which were published and 9 of which were not published. The results of this review suggested that students are more likely to achieve in smaller classes and therefore learn better in smaller classes. When the data were analyzed by subject, smaller class sizes had a positive impact on social science, math, reading, and science courses. In science courses this impact was not as significant, but the researchers assumed this was due to state tests focusing mainly on reading and math. In terms of school level, smaller class sizes had a greater impact on elementary schools than on secondary schools. Many studies also inferred that smaller class sizes are more beneficial to minority and disadvantaged students (Shin & Chung, 2009).

**Student–Teacher Relationship**

A key component in any classroom environment is the relationship that develops between students and their teachers. While imparting knowledge onto youths is relatively easy, it is ineffective if those youths are not receptive to that knowledge. As a teacher, one must gain a student’s heart before one can impart lasting knowledge into a student’s mind. According to the sociocultural theory, children learn through social interactions with adults. The ecological systems theory states that all parts of a family are
interconnected and cannot be viewed separately. Translating these theories into the classroom environment, it is very important that teachers develop a meaningful relationship with students and that the classroom environment is safe and conducive to learning (Sullivan, Hegde, Ballard, & Ticknor, 2015).

A recent study published in Early Childhood Development and Care journal examined the correlation between kindergarten teachers of ELLs and kindergarten ELLs to determine if teachers differ in their interactions with ELLs and non-ELLs. The study was conducted with 30 kindergarten teachers in North Carolina across three different districts. It was found that instructors keep up closer associations with non-ELL students than their ELL peers. While these meaningful relationships are key to nurturing a positive learning environment, they are hard to fashion against significant language and sociocultural barriers that exist between educators and students. Observations of these teachers found that they focus more on phonics and writing with ELLs than with non-ELLs. Sociocultural theory expresses that kids learn through social connections and, thus, effectively seek information through interacting with their surroundings. With instructors' endeavors to develop ELLs' CALP achievement, it is vital to remember that language is best learned through connection. Research has demonstrated that dialect is best created in a variety of circumstances that promote talk and communication (Sullivan, Hegde, Ballard, & Ticknor, 2015).

In developing relationships with students, educators must be culturally responsive. In their 2012 article published in the *Kappa Delta Pi Record Journal*, Martins-Shannon and White defined culturally responsive teaching as, “understanding
students’ prior experiences and learning styles, as well as using cultural knowledge to ensure that learning is appropriate to culturally diverse learners. It is vital for teachers to consider cultural characteristics that influence a student’s learning style” (Martins-Shannon & White, 2012, p. 1). Through culturally responsive teaching, educators incorporate the various cultures, languages, and traditions of students into class lessons. In such an environment, all students are more likely to feel comfortable participating in class discussions. Environments that are sensitive to both ELLs academic as well as cultural needs promote student success (Martins-Shannon & White, 2012).

**Teacher Competency in ELL Strategies in Science**

**Curriculum Content**

As of now, one in five students in the U.S. originates from a home in which a dialect other than English is spoken. By the year 2030, the number of English as second language students is expected to increase 40%. Despite this predicted increase, teachers are not sufficiently prepared to work with ELL students. Often times, teachers of ELL students walk into their classrooms having received minimal training in strategies that work best with ELL students. These teachers also overwhelmingly believe that students should grasp the English language both academically and socially within two years of enrolling in United States schools (Berg, Petron, & Greyback, 2012).

In their 2012 article titled “Setting the Foundation for Working with English Language Learners in the Secondary Classroom,” Berg, Petron, and Greyback (2012) stated that teachers must use more kinesthetic methods to best meet the needs of ELLs. Teachers must assess and understand their student’s academic background. Amount of
schooling in the native language positively effects ability and the amount of time it takes for a student to develop CALP. Moreover, instruction should be meaningful to students and make connections between concepts and students’ real life experiences. Instruction should also be culturally responsive and it should foster peer interaction. Whenever possible, teachers should use multicultural texts or bilingual books to supplement textbooks. Through meaningful cooperative grouping, teachers can foster positive academic interactions between students while indirectly encouraging students learn to speak in English (Berg, Petron, & Greyback, 2012).

In terms of communication, when speaking to students, teachers should speak clearly and slowly, with a natural flow, and avoid using slang terms. ELLs do not yet have the capacity to distinguish between proper English and slang and will emulate any speech heard from their teacher. Any written materials used should be made comprehensible. Because textbooks are concept heavy and the language is scholastically and phonetically thick, students should be taught how to access the information in textbooks. Moreover, textbooks should not be the basis of lessons. Assessments should be multifaceted, not just the traditional test. Allow ELLs to show what they have learned through projects rather than through a test. Lastly, in grading ELLs, focus on the content and mastery of the concepts rather than the grammatical format (Berg, Petron, & Greyback, 2012).

In years past, teachers may have possessed the capacity to get by with knowing just the basics about educating ELLs. With expanding quantities of ELLs, most teachers
will encounter such students eventually in their educating profession (Berg, Petron, & Greyback, 2012).

As with all core subjects, literacy plays a key role in competency in science curriculum for ELLs. In their article examining literacy strategies science teachers can use in their monolingual non-sheltered classrooms, Sandefur, Watson, and Johnston (2007) outlined ten strategies that will increase the literacy level of ELLs. The strategies, while not varying much from the above-mentioned items, are specific to science content. In addition to the above strategies, they included the following:

- Modify concept and content-rich scientific text into a more student-friendly format. The use of graphic organizers can help ELLs to visually see and understand the relationships between various concepts.
- Provide students with the background knowledge necessary to understand concepts through video, pictures, and hands-on activities that force students to seek information about the lesson.
- Help students to comprehend scientific reading / lesson through read alouds. One should also model one’s thinking by asking students probing questions to insure they comprehend the lesson.
- Allow students the time necessary to process information and complete tasks (Sandefur, Waston, & Johnston, 2007).

With the continuous increase in the number of ELL students and the lack of qualified ELL teachers, it is inevitable that ELLs will be in mainstream classes. Therefore, it is essential for all teachers to know about both social and etymological
contrasts and the impact these have on execution in scholastics, classroom behavior, and social association. Instruction of ELL students requires one to adopt an essential rule that encourages and embraces the value and brilliance in culturally diverse learners. These standards are definite in the accompanying articulations: (a) Good educational modules start things out; (b) All undertakings should take into consideration every learner; (c) When in uncertainty instruct up; (d) Use assessment to guide instruction; and (e) Grade to reflect development (Sandefur, Waston, & Johnston, 2007).

**Instructional Strategies**

Due to lack of proficiency in academic English, ELLs typically do not perform well on non-kinesthetic activities. Material must be presented in a variety of ways that allow ELLs to experience learning through their senses. Often times, older ELLs have only had limited or interrupted schooling in their native countries prior to coming to the United States. However, these students are still expected to meet the same academic expectations as their English-speaking peers. Because of language deficits, while ELLs are able to master concepts, ELLs do not have to capacity to express mastery of concepts through traditional methods.

In their 2012 article, Haneda and Wells outlined four principles that teachers can use to insure that ELLs are able to express what they have learned to the full extent of their capabilities. Unmistakably, there is no basic answer for the issue that schools face in giving impartial learning chances to ELLs, given these students' unfathomably diverse levels of capability in English on entry. In a perfect world, all instructors would be professionally arranged to meet the double needs of these students, yet that is positively
not the situation at the present time. On the other hand, there are steps that all educators can take that will make it workable for recently arrived ELLs to settle in and to take an interest to the full degree of their abilities from the earliest starting point. The first principle states that ELLs need assignments that give them frequent opportunities to talk and write. In order to develop language skills, students must practice. The second principle says assignments/curriculum should also connect to students’ lives. Such assignments make it easier for teachers to assess prior knowledge and make connections to new learning. The third principle states topics must be interesting and engaging to students. Students are more willing to learn about things that are fascinating or interesting to them. For example, allowing students to select the portion of a broad topic they would like to explore makes learning more student-centered. The final principle says assignments should be geared towards some type of tangible outcome such as a poster, graphic organizer, model or textual representation (Haneda & Wells, 2012).

Moreover, secondary ELLs often understand more than they have the capacity to linguistically express. To abstain from diluting the science educational programs for ELLs, educators must give an assortment of errands suitable to ELLs’ capability levels, while keeping up a testing intellectual interest. In her 2014 article in The Science Teacher, Bautista correlated tasks ELLs can complete to their level of English language proficiency. “The Teachers of English to Speakers of Other Languages International Organization specifies five language levels in which ELLs can demonstrate measurable proficiencies: starting, emerging, developing, expanding, and bridging,” (Bautista, 2014, p. 33).
• Students at level 1 (starting) seldom communicate in English. Tasks for these students should be expressed as basically as possible. These tasks should also include visuals, which will allow students to make connections to materials.

• Students at level 2 (emerging) have started to develop Basic Interpersonal Communication Skills (BICS). Tasks should still be relatively simple, but should start to require students to linguistically express a basic understanding of the concept.

• Students at level 3 (developing) have fully developed BICS. Tasks requiring students to read and write can be increased and teachers can begin using texts to assess prior knowledge.

• Students at level 4 (expanding) are starting to develop Cognitive Academic Language Proficiency (CALP). Tasks for these students should be comparable to those for non-ELLs. However, teachers must constantly check for understanding of concepts and modify lessons if necessary.

• Students at level 5 (bridging) have fully developed CALP and can be expected to do the same tasks with minimal mistakes as non-ELLs.

Regardless of the level an ELL, it is important that teachers ask challenging questions and compel students to use higher order thinking skills. It is not until students elicit higher thinking that they truly learn material. For level 1 ELLs, this may seem impossible but is necessary. Although level 1 ELLs may not be able to express linguistically how they created a project, they are able to use pictures to show an understanding of the concept (Bautista, 2014).
Parental Involvement

Parental involvement is a key component in student achievement at-risk populations. However, for various reasons, most parents of English Language Learners are reluctant to become involved in their student’s education. In their 2012 study published in the *School Community Journal*, The Chicagoland Partners for English Language Learners program explored parental involvement of English Language Learner parents through Epstein’s multidimensional framework of parental involvement. According to Epstein (cited in Vera et. al, 2012), there are six ways in which parents can become involved in their child’s education:

1. **Parenting**: providing a home situation that is favorable with learning.
2. **Communicating**: building a consistent, two-way dialog between educators and other important school staff.
3. **Volunteering**: assisting at and supporting school sanctioned events or in the classroom.
4. **Learning at home**: giving chances to improve learning outside of school.
5. **Decision Making**: partaking in the development / improvement of school policy.
6. **Collaborating with the community**: garnering community support for the school.

In accordance with this framework, it is possible to assume that parents should have no issues becoming involved in their student’s education. However, due to language barriers, often times parents of English Language Learners are reluctant to participate in their
student’s education. These parents are limited to “parenting” because they lack the linguistic skills to assist in any other way.

The study, conducted in a large Midwestern metropolitan area, included 239 parents of elementary ELLs. Participants represented 28 cultural backgrounds and had been living in the United States from various lengths of time ranging from 1 to 28 years. The study found that EL parents were most likely to monitor students’ academic performance and talk to their children about their experiences at school. They are least likely to initiate communication with the school / teachers and saw language as the main barrier preventing parents from effectively communicating with the school and being more actively involved in their child’s education (Vera, et al., 2012).

Another study conducted in 2008 examined parental involvement in terms of student achievement. Parental inclusion has been absolutely connected to markers of student achievement, including instructor evaluations of student ability, student grades and standardized test scores. Moreover, with active parent involvement, students are less likely to be retained or to dropout; and are more likely to graduate high school on time and participate in advanced placement courses. Research has shown that parental involvement can have an impact on student achievement that is ten times greater than that of socioeconomic status (Braley, Slate, & Cavazos, 2008).

The study, which surveyed 229 parents of at-risk high school students, most of who were Hispanic, found that while parents understand the importance of participating in their student’s education, more than half of those surveyed are reluctant to do so for various reasons. These reasons include linguistic capabilities, scheduling conflicts (events
scheduled when parents are working or otherwise unable to attend), and not feeling welcomed at the school (Braley, Slate, & Cavazos, 2008).

**Study Habits**

ELLs enter high school with a disadvantage—they are learning both the English language and academic English simultaneously. In order to compete with their non-ELL peers, they must strive to overcome the limitations associated with not being fluent in the English language. Studying both academics and language nightly plays a key role in achieving this goal. However, according to a study published in the Spring 2003 edition of American Secondary Education, students enter high school not understanding how to properly study. Through a three-part study, a high school in the Midwestern United States found a way to combat this issue (Faulk, 2003).

In the first two phases of the study, the researchers gathered information from relevant stakeholders: teachers and students. Teachers were surveyed regarding their perceptions of freshman students’ study skills in comparison to course requirements during the first phase. During the second phase of the study, students were surveyed in order to discover their perceptions of their own strengths and weaknesses as it relates to studying. Information gathered was analyzed and used to facilitate a program redesign to help freshman students successfully transition into high school. Some initiatives that came from this research include collaborations with feeder middle schools, professional developments for teachers in best practices for helping students to understand how to study, summer orientation to help freshman become acclimated to the expectations of high school, student planners to keep students organized, and tutoring to further decrease
student deficiencies. Through the implementation of these initiatives, the rate of freshman course failure slightly decreased, from 25% to 22%, and absenteeism and disciplinary referrals decreased, while grade point averages increased (Faulk, 2003).

Another study, which was conducted in India, compared student study habits to academic achievement. The study targeted 9th grade students at an English medium high school in India. The study found that students essentially do not understand how to properly study. They lack organization and time management, have poor reading and test taking skills, and are afraid to ask their teachers for help. These unfavorable study skills negatively affected academic achievement. The study found a positive correlation between study habits and academic achievement. Moreover, when students know and understand how to study, they are more likely to achieve academic proficiency (Siahi & Maiyo, 2015).

**Immigration Requirements**

In terms of immigration, there are two ways in which an immigrant can become a United States citizen: naturalization or derivative citizenship. Through the naturalization process, a foreign citizen completes several steps in order to prove to the government that they are worthy of becoming a United States citizen. Immigrants must meet the following requirements:

- Be 18 years of age or older
- Have lived as a permanent resident of the United States for at least five years
- Be deemed a person of good moral character by the government (no criminal or suspicious activity)
- Be able to pass a basic United States history/civics test
- Demonstrate a basic understanding of both written and oral English (U.S. Citizenship and Immigration Services, 2012).

Another way one can obtain U.S. citizenship is through derivative citizenship. One is automatically granted citizenship if at least one parent is a U.S. citizen at the time of the child’s birth or if a parent becomes naturalized before the child reaches 18 years of age. Students included in this study will be obtaining citizenship through either naturalization or derivative citizenship (U.S. Citizenship and Immigration Services [USCIS], 2012).

Obtaining citizenship is no easy task; the USCIS Naturalization test that immigrants are required to pass before citizenship can be granted is difficult for even native-born citizens to pass. In their 2010 article titled “High School Students’ Knowledge of Citizenship,” Joseph Feinberg and Frans Doppen conducted a study to assess high school students’ knowledge of basic citizenship. As part of their social studies classes, the USCIS Naturalization test was administered to two groups of high school students – “one group from a racially and homogenous region of southeast Ohio and one group from a diverse metropolitan area in northern Georgia” (Feinberg & Doppen, 2010, p. 112). The study found that non-immigrant Native American students lacked the basic knowledge and skills to correctly answer all of the questions. While test makers seek to insure that immigrants taking the exam are proving they are of good moral character and would be an asset to the United States, the test’s trivia-type questions encourage rout
memorization of facts, rather than allowing test takers “to articulate what type of citizen they aspire to be” (Feinberg & Doppen, 2010, p. 114).

Moreover, the test does is not a valid indicator of what type of citizen a person has the potential to be. The high school students participating in this study are essentially the types of citizens the country needs in order to promote democracy, but the naturalization test’s multiple choice questions do not accurately portray this notion. Immigrants have a limited understanding of the English language and may misinterpret the meaning of a question. As a result, some immigrants are prevented from becoming citizens due to a lack of understanding.

Another factor in dealing with the issues that immigration may present in education is the notion that schools are not required to disclose a student’s immigration status to classroom teachers. In her 2010 article, Success with ELLs, Margo DelliCarpini shed light on the fact that because it does not play a vital role in a student’s education, most teachers do not know the immigration status of their students. Due to Plyer v. Doe Supreme Court decision in 1982, schools “must provide equal access to all students regardless of immigration status” (DelliCarpini, 2010, p. 103). While it does not have a profound effect on what is taught in the classroom, if teachers were made privy to this information, they could tailor their classroom procedures/lesson plans to best fit the needs of immigrant students. Immigrant students going through the naturalization process must sometimes miss school to meet with immigration officers or to participate in supplemental classes for the USCIS Naturalization test. Teachers who are aware of these
dates can tailor their lessons to insure that no tests or new material is presented on days that students will miss due to immigration requirements (DelliCarpini, 2010).

DelliCarpini also mentions that ELLs are not motivated to do well in school. Because ELLs are not United States citizens, they are not eligible for federal grants and loans, in-state college tuition waivers, or anything that requires a social security number or background check. *Plyer v. Doe* only applies to K-12 education and does not extend to higher learning. If ELLs wish to pursue a college education, they must pay double, sometimes triple, the amount that a citizen must pay for college. Getting a high school diploma is seen in modern society as the gateway to higher learning; for immigrants it is just a piece of paper that allows them to only obtain blue collar jobs (construction, landscaping, etc.) and attain the same financial success their parents attained without a high school diploma (DelliCarpini, 2010).

**Age**

English Language Learners immigrate into the United States at various ages. An ELL’s age at the time of immigration directly correlates to the rate at which an ELL acquires English language proficiency. In her 2007 article published in the *Montessori Life Journal*, Selman stated that numerous studies of the correlation between age and language acquisition have found that children who begin learning a second language before the age of 7 are more likely to acquire native-like fluency. In contrast, their older siblings, who may assimilate into a secondary school or a school of higher education, may struggle to attain the same level of fluency, even after several years of instruction. It is suggested that if younger ELLs are continuously encouraged in their endeavors to
acquire a second language and are simultaneously given adequate “naturalistic” exposure to the second language, they will attain language proficiency quicker than if only exposed to the second language through formal instruction (Selman, 2007).

In 2011, Huang and Ju conducted a study examining the correlation between an immigrant’s age of arrival and second language prosody. The term prosody, as it relates to learning a second language, refers to the unique intonations and rhythms of a language. Moreover, having great prosody is key to attaining native-like fluency in a second language. The study, which examined Mandarin-speaking immigrants with varying Ages of Arrival (AoA), used native English speakers as controls. The participants, all having lived in the United States for at least 5 years and ranging in age from 5-27, were divided into 3 groups: Child Arrivals (AoA = 5-9 years old), Adolescent Arrivals (AoA = 12-17 years old, and Adult Arrivals (AoA = 20-26 years old). For this study, participants read and recorded a paragraph, which was analyzed for prosody (intonations and rhythm) (Huang & Jun, 2011).

The study found that Adult Arrivals deviate the most from native speakers in prosody. However, while adults deviate the most, the deviation was not a significant difference from that of Adolescent Arrivals. Child Arrivals, on the other hand, performed similarly to Native Speakers. Moreover, younger arrivals’ speech was patterned similarly with Native Speakers. Adult Arrivals paused frequently throughout their recordings and were unable to attain a native-like flow (Huang & Jun, 2011).
Gender

Numerous studies exist exploring the relationship between gender and academic performance. Most of these studies show that on average, female students perform better academically and graduate at higher rates than males. While males seem to excel in the areas of math and science, females excel in all other areas (literacy, writing, and general knowledge). Because of their verbal capacity, female students are able to find ways to overcome their mathematical and scientific shortcomings (Zembar & Blume, 2009).

These findings are mirrored in the Latin American community. In their 2014 study exploring the role of gender in bilingual education, Lapayese, Hutching, and Grimalt found that gender plays a significant role in bi-literacy achievement (being academically competent in two languages, both Spanish and English) of Latin ELLs. The study, which was conducted at four schools in a large urban school district in Southern California, spanned four years and followed the same group of Latina/o students from second grade to fifth grade. While their achievement differences were not as significant in grades 2-4, during the students’ final year in the study (fifth grade), female students considerably outperformed their male counterparts (Lapayese, Hutching, & Grimalt, 2014).

The findings in this study mirror existing literature on the academic performance of Latino males. Reasons for this underachievement, which are complex and complicated, include cultural factors and socioeconomic background. When these factors combine with the demands associated with schooling, the result is low achievement for Latino males. Moreover, females see themselves as successful in writing conventions while
males identify success with audience appeal and creativity. Traditional schooling favors writing conventions over creativity, leading to the misconstrued academic achievement of Latino males (Lapayese, Hutching, & Grimalt, 2014).

Another study examined the relationship between sense of belonging, gender and academic achievement. In their 2005 study, Sanchez, Colon, and Esparza found that for Latino students, sense of belonging significantly predicted factors such as academic motivation, effort, and absenteeism. However, this sense of belonging affects males and females in different ways. For females, sense of belonging positively correlated to intrinsic value for and expectancy for success in English. The more Latina females feel as if they are productive members of the school, the more successful they will aspire to be. For males, sense of belonging was significantly related to absenteeism and educational expectations. The less connected to the school Latino males feel, the higher their rates of absenteeism and the lower their educational expectations will be (Sanchez, Colon, & Esparza, 2005).

**Emergent Themes**

There are many factors that contribute to the academic achievement of English Language Learners in science. A review of the literature revealed that English Language Learners enter school at a disadvantage to non-ELLs. It generally takes ELLs 2-5 years to acquire conversational English; depending on their level of academic proficiency in their native language, it can take more than 3 additional years for ELLs to develop academic English. ELLs acquire Cognitive Academic Language Proficiency though consistent, meaningful, and continuous experiences in speaking and learning in English (Lavadenz,
This can only be accomplished though consistent attendance. In non-ELLs, absenteeism reduces academic performance; because school may be the only time that an ELL uses the English language consistently, absenteeism significantly reduces academic performance in ELLs (Paredes & Ugarte, 2011).

Other important factors in ELL student achievement in science include class size and the student-teacher relationship. ELLs achieve at greater levels in smaller classes (Wyss, Tai, & Sadler, 2007); small classes provide ELLs with a setting in which the teacher can connect with his/her students. This connection leads to an environment that is culturally, linguistically, and academically sensitive to the unique needs of ELLs (Martins-Shannon & White, 2012). Moreover, the smaller class environment makes implementing more kinesthetic and literacy learning strategies for ELLs easier (Berg, Petron, & Greyback, 2012). Often times, ELLs are capable of learning information in science class, but are incapable of expressing that knowledge linguistically. ELLs must be given the opportunity to show mastery of a concept through various instructional strategies including graphic organizers, concept maps, models, drawings, and textual representations. These types of assignments, along with kinesthetic class activities, help ELLs in developing the academic vocabulary necessary to understand scientific concepts (Bautista, 2014).

A review of literature concerning ELL parental involvement revealed that will ELL parents want to be active participants in their child’s education, they are reluctant to do so for various reasons. These reasons include English language deficiencies, conferences held at inopportune times, and a lack of academic skills necessary to assist
students with homework (Vera, et al., 2012). Students with actively involved parents are less likely to be retained, and more likely to graduate and participate in AP courses (Braley, Slate, & Cavazos, 2008).

While no literature was available concerning the study habits of ELLs, a review of literature concerning the study habits of non-ELL students in general revealed that high school students do not know or understand how to properly study. These students lack the knowledge, skills, and dispositions to properly organize the information taught into manageable segments, which can be easily studied. This lack of study skills has a negative effect on student achievement (Faulk, 2003).

Although immigration does not have a significant impact on what is taught in the classroom, it does indirectly impact student achievement. Often times, secondary ELLs must miss school to meet immigration requirements. On the contrary, due to their status as immigrants, ELLs are not motivated to do well in school. While they are able to enroll in an institution of higher education, ELLs are less likely to do so because they must pay foreign student fees, which can be significantly more than the tuition for U.S. citizens. For these reasons, immigration requirements can negatively effect ELL student achievement in science (DelliCarpini, 2010).

In reviewing literature on age, it was found that an ELL’s age at the time of immigration directly correlates to their level of English language proficiency. Moreover, the older an ELL is at the time of immigration, the more difficult it will be for that ELL to attain English language proficiency. For ELLs, attaining some level of English
language proficiency is a pivotal step achieving cognitive academic language proficiency (Huang & Jun, 2011).

Studies of how gender correlates to student achievement in general reveal that female students achieve at higher levels than male students. These findings are mirrored in the Latin community. Female students are generally better at expressing learning through verbal / written methods; males generally better at expressing learning through creative methods such as building models and experimenting. Current education methods and trends readily favor verbal and written methods, making it appear that females are better students than males (Lapayese, Hutching, & Grimalt, 2014).

Sheltered classrooms provide ELLs with smaller class sizes, more individualized attention, and more opportunities to express what they have learned in non-linguistic ways. Although the research shows that bilingual classrooms provide the best learning environment for ELLs, they are not the most practical. Bilingual classrooms only work in environments in which all ELLs speak the same language. In a true ELL classroom, students may speak several different languages (Echevarria & Vogt, 2010).

**Summary**

In conclusion, the literature review revealed that while there is a plethora of research that exists pertaining to the subtopics/variables of this research, there are gaps as it pertains specifically to secondary ELLs. Specifically, research focused on one aspect of the variable and not the variable as a whole. For example, in terms of attendance, the research focused on the effects of absenteeism on high school students in general, not ELLs who are high school students. However, taken collectively, data from the literature
review revealed that the researched variables have a significant impact on ELL student achievement in science. The research supported the position that proper class placement is key ensuring that ELLs needs are met culturally, linguistically, and academically so that achievement can occur.
CHAPTER III
THEORETICAL FRAMEWORK

Introduction

The theoretical framework for this study provided an explanation of how the dependent variable, ELL student achievement in science, related to the 12 independent variables. The study focused on the following two theories: Krashen’s Second Language Acquisition Theory (2013) and Vygotsky’s Sociocultural Theory (1978). Combined, these theories provided the framework needed to understand the context of this study.

Krashen’s Second Language Acquisition Theory

Stephen Krashen’s theory is based on five hypotheses:

1. The Acquisition-Learning Hypothesis states that humans naturally acquire language subconsciously; one is not aware that he/she is acquiring the language. Language learning is cognizant; one knows he/she is learning and is trying to learn. When learning a new language, one must first acquire the language subconsciously, and then consciously apply what has been acquired to language learning.

2. The Monitor Hypothesis states that once one has learned the language, learning acts as the monitor, correcting and editing what has been acquired.

3. The Natural Order Hypothesis states that language acquisition is progressive and sequential—progressing naturally from simple to more complex language.
4. The *Input Hypothesis* states that language must be delivered in a way that the learner can understand, but that is slightly higher than the learner’s current proficiency level (Comprehensible input + 1).

5. The *Affective Filter Hypothesis* states that the learner must be comfortable enough to take risks in the language-learning situation. (Krashen, 2013)

Krashen’s theory follows the same basic principles that apply to a baby learning how to speak. A baby learns to speak through listening to and imitating the sounds that it hears. Over time, the child learns that certain sounds mean certain things. As time further progresses and the child develops and gets older, its language progressively becomes more complex through practice and learning. Essentially, the child’s vocabulary develops and becomes more complex through being progressively challenged throughout his or her academic career. When learning to speak initially, language is not learned through correcting grammar and teaching rules; it is learned through acquisition from meaningful experiences (Schutz, 2007).

**Vygotsky’s Sociocultural Theory**

According to Vygotsky’s Sociocultural Theory (SCT), socialization plays a key role in the expansion of understanding. Learning occurs in two stages: first, through social interactions with others, and then within an individual’s own mentality. In the case of second language acquisition, through social interactions, individuals acquire language; over time, individuals learn to process that language, commit it to memory, and form a knowledge base that allows them to acquire more language. An additional aspect of the sociocultural theory is the notion of the zone of proximal development. This “zone” is the
region of investigation for which the student is psychologically equipped to access, yet in order to fully advance into this area, one requires additional help and socialization. Applying this notion to second language acquisition, language is learned through building on what the learner already knows and scaffolding (Vygotsky, 1978).

Assuming that much of language learning occurs through socialization, sociocultural theorists stress that language learning is essentially being “able to communicate one’s thoughts and feelings to another person” (Aimin, 2013, p. 165). SCT trusts that dialect can be gained effectively by permitting the students to mingle and associate either with other learners (those who are also learning the language) or with native speakers of the dialect they are learning. It is important that this socialization is “within the context of the language being learned” (Aimin, 2013, p. 166). Connecting the SCT to the classroom, students can acquire the academic component of a second language through activities that give students the chance to interact socially with each other and their teachers (Aimin, 2013).

The previously mentioned theories correlate the research questions because each offers logic of how ELL students and ESL teachers learn to communicate with each other. Communication is the key to increasing ELL student achievement. In the secondary ESL classroom, students must learn both oral and academic English. Both Krashen’s (2013) SLA theory and Vygotsky’s (1978) sociocultural theory emphasizes that communication is key to achievement in the classroom; learning to understand and properly use the new language takes time. However, despite language acquisition being a gradual process, secondary ESL students must still meet the same rigorous academic
goals of their native English-speaking counterparts. Though ELLs may quickly develop BICS, it may take significantly longer for them to develop CALP.

**Definition of Variables and Other Terms**

**Independent Variables**

**Class Placement: Sheltered Instruction (ESL Class) or Mainstream Classroom:** Sheltered instruction is an instructional approach used to make academic instruction in English understandable to Limited English Proficient (LEP) students. Students in these classes are “sheltered” in that they do not compete academically with native English speakers since the class includes only LEP students. In the mainstream classroom, English fluency is assumed. In contrast, in the sheltered English classroom, teachers use physical activities, visual aids, and the environment to teach important new words for concept development in mathematics, science, history, home economics, and other subjects. This study focused on ELLs in ESL (sheltered instruction) classes and ELLs in non-ESL (mainstream) classes.

**Cognitive Academic Language Proficiency (CALP):** CALP refers to ELL’s usage, understanding, and comprehension of the academic English language. In most schools that educate ELLs, it is measured using WIDA’s ACCESS Test. Depending on their proficiency, ELLs can score anywhere from 1 (beginning to understand academic English) to 6 (reaching the same level of academic English proficiency as non-ELLS). Students who score below 4.9 are placed in sheltered ESL classes, while students who score above 5 are placed in general non-ESL classes. This study focused on ELLs who score between 3 and 4.
**Attendance:** In order to learn, students must attend school on a general basis. Students cannot be absent more than 15 consecutive days. This study focused on students in four groups: those who have missed less than 5 days, those who have missed between 5 and 10 days, those who have missed between 10 and 15 days, and those who have missed more than 15 days. These absences do not have to be consecutive.

**Class Size:** Secondary ESL classes can have a maximum of 22 students with no paraprofessional educator and 24 students with a paraprofessional educator. This study focused on ESL classes with 24 or less students and non-ESL classes, which can have up to 36 students.

**Teacher-Student Relationship:** Teacher-student relationship is defined as the emotions (teacher caring) and understandings that develop between teachers and their students over time through continuous interactions. Through observations and interviews, this study examines on how teachers and students relate to one another.

**Teacher Competency in Science Strategies for ELLs:** In educating ELLs, one must stay abreast of the latest trends and strategies in both the content area and specific strategies for ELLs. Competency refers to how teachers relay information, applications, and skills to students. Moreover, it also encompasses teachers' content knowledge, techniques and methods for passing this knowledge to students. Through observations and lesson plan analysis, this study focused on the strategies science teachers use in educating ELLs.

**Instructional Strategies:** Due to lack of proficiency in academic English, ELLs typically do not perform well on non-kinesthetic activities. Material must be presented in
a variety of ways that allow ELLs to experience learning through their senses. Assignments refer to tasks given to students that are intended to allow students to demonstrate an understanding of a lesson’s concepts. These include projects, experiments, notebooks, and tests. This study focused on the types tasks (assignments) teachers assign to ELLs.

**Parental Involvement:** Parents play an integral role in their student’s education. Parental involvement is defined as the participation of parents in their students’ education. Parental involvement comes in many forms, including but not limited to attending school conferences, consulting with teachers about student’s academic progress and/or behavior, attending school events outside of conferences, and helping with homework. This study focused on parental involvement through examining parental conference attendance and teacher’s parent call-log.

**Study Habits:** Study habits are defined as the practices utilized when planning for tests or learning scholastic material. This study examined the students’ quality and methods of study.

**Immigration:** Immigration is defined as the process through which an individual becomes a permanent United States citizen. Becoming a United States citizen can be a lengthy, stressful, and time-consuming process. This study focused on the aspects of the immigration process that may keep ELLs from attending school generally.

**Dependent Variable**

**ELL Student Achievement in Science:** Student achievement is defined as how well student does academically in obtaining and retaining the skills taught. A definitive
objective for any teacher of ELLs is to enhance students’ academic capacity and prepare them to become productive United States citizens. This study measured the amount of science content an ELL learns during one semester. A compilation of scores from teacher-made materials and teacher-made common assessments is included in the study. Students who scored 75% or higher as a final grade were considered proficient.

Demographic Variables

Age: Age is defined as how old a student is during the spring semester of 2016. Students range in age from 14 to 21. Once a student reaches 22 years old, he/she ages out of high school and must attend open campus. This study focused on students ranging in age from 14 to 21.

Gender: Gender is defined as being male or female. In some instances, gender plays a significant role in academic performance. This study examined the difference in motivation and academic performance between ELLs of different genders.

Figure 1 shows the relationship among the variables.
Figure 1. Relationship among the variables.

**Independent Variables**
- Classroom Placement
- Cognitive Academic Language Proficiency
- Attendance
- Class Size
- Teacher-Student Relationship
- Teacher Competency in ELL Strategies
- Assignments
- Parental Involvement
- Study Habits
- Immigration Requirements

**Demographic Variables**
- Age
- Gender

**Dependent Variable**
- ELL Student Achievement in Science
Limitations of the Study

The limitations of this study are as follows:

1. The study only focused on a select group of students at one school. The students come from various cultures and have varying levels of English language proficiency. Culture plays a major role in the amount and type (were students taught in their native language or in English) of schooling students received prior to coming to the United States. For example, students from Africa were taught in English and have a much easier time transitioning into American schools. Students from Asian countries typically attend school generally and although learned in their native language, attained academic proficiency in English quickly. Because the amount of schooling students received in their native country varied drastically, students had varying levels of academic proficiency, which in turn has affected their academic achievement. While all students chosen for this study speak a language besides English at home, some of ELLs at were born in the United States and as a result are more proficient and able to better communicate than other students.

2. Because the study only focused on one subject (science), there are a very limited number of teachers who were included in the study.

3. Due to limited English language proficiency and other factors, parental involvement at the school was limited and could only be examined from the perception of the teacher.
Although parents at the school may want to be more active participants in their child’s education, most are reluctant to do so due to other obligations such as having to work to provide for their families, not being able to secure child care in order to attend a conference or event, not having adequate transportation to the school, etc. Despite having a parent center in the school, which provides parents with translators and other resources to help them be a part of their child’s education, parents are still reluctant to participate. These limitations were derived from the perceptions gained by the researcher by from teachers who participated in the study.

4. The researcher selected the lesson to be observed and informed the teachers of what the researcher would be looking for in during the observation.

5. The sample size (30 student participants) was very small.

6. Survey was administered in the days following the election of Donald Trump as president of the United States.

Due to our country’s political climate in reference to immigrants, study participants may have feared deportation and questioned their futures in the United States.

7. Study only included student participants whose ACCESS scores were in the middle range (between 3-5); students who scored above and below this range were not included.

8. Although there are four administrators at the school, only one was interviewed for this study. As a result, some administrator responses had to be inferred.

9. The researcher is an employee at the school.
At the school chosen for this study, there were only 11 science teachers. Of the twelve science teachers, only 6 of those science teachers were ESL certified. The researcher was one of those 6 teachers.

**Summary**

Chapter III provided an overview of the theoretical framework of this study. This framework focused on two theories: Krashen’s Second Language Acquisition Theory (2013) and Vygotsky’s Sociocultural Theory (1978). In addition to providing a framework for the study, the researcher also provided the independent and dependent variables.
CHAPTER IV
RESEARCH METHODOLOGY

Introduction

The study was designed to determine the most academically lucrative science classroom setting for English Language Learners. Across the nation, ELLs are placed in various science classroom settings based on several models. While all have benefits and pitfalls, the type of setting depends on the availability of resources within the school district. The study focused on a district that used the sheltered ESL classroom model. Specifically, this study used qualitative methods to answer the question, which setting—sheltered ESL classroom or mainstream classroom—was the most academically lucrative for English language learners in science. Results from this study will assist school districts nationwide in placing ELLs in the proper classroom setting so that they can experience similar academic gains to their non-ELL peers.

Research Design

The topic of secondary ESL education does not readily lend itself to quantitative research. While one can analyze test data and the grades of ELL students, this type of data does not reveal the true nature of secondary ESL education. There are many factors that contribute to the achievement of ELL students that cannot be quantified. Therefore, the best engine for exploring secondary ESL education is a case study.
“A case study is the study of an issue through one or more cases in a setting or context” (Creswell, 2013, p. 97). A case study uses multiple sources of data to explore a central theme or concept. This research was conducted as a single instrument case study. In a single instrument case study, “the researcher focused on an issue or concern, then selects one bounded case to illustrate this issue” (Creswell, 2013, p. 99). This case study focuses on the issue of how communication effects the achievement of ELL students at the selected high school.

According to Maxwell (2005), “design in qualitative research is an ongoing process that involves “tacking” back and forth between the different components of the design, assessing the implications of goals, theories, research questions, methods, and validity threats for one another” (p. 3). Qualitative research commonly includes the investigation of people in regular settings, rather than in settings created by the researcher, frequently utilizing open-ended questions meant to evoke itemized, detailed accounts of the interviewee’s views on particular issues, circumstances, or occasions. Qualitative techniques utilize information as words: transcripts of open-ended interviews, composed observational portrayals of exercises and discussions, and documents and other artifacts of individuals’ activities. Such information is investigated in ways that hold their intrinsic literary nature. This is because the objectives of qualitative research typically include understanding a marvel from the perspectives of the participants, and in its specific social and institutional connection. Because they cannot be readily quantified, these objectives may be lost when used in quantitative research (Maxwell, 2005). This case study will gather information through observations, interviews, focus group, and
survey. Each method of data collection allowed the researcher to discover different aspects of the issue and used these new discoveries to make implications concerning the best placement option for ELLs in secondary science classes.

**Description of the Setting**

Research for this qualitative study was conducted at a public high school located in the Southeastern United States. The school is located in a portion of the metro area that is heavily populated with Hispanic Americans and Hispanic immigrants. Opened in 1950s, the school serves students from its surrounding neighborhoods. To encourage parental participation, the school has a parent center in which parents can learn skills to help their children be successful in school in the United States. Although this school is a smaller high school, it is considered one of the most culturally diverse high schools in the metro area, with students from 47 countries who speak 27 different languages. The student body is composed of 80% Hispanic, 11% black, 6% Asian, 1% white, and 1% other racial groups (School District Data, 2014). Moreover, 98% of the school’s student population comes from economically disadvantaged backgrounds. Through sheltered ESL classes, the school strives to meet the needs of English Language Learners. The school has 11 science teachers (see Table 2), 45% of whom have more than 10 years of classroom experience and 82% of whom are ESL certified in science (School District Data, 2014). The table details the school’s science teacher demographics.
Table 2

Science Teacher Demographics (School District Data, 2014)

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Years of Experience</th>
<th>Degree</th>
<th>ESL Certified</th>
<th>Languages Spoken</th>
<th>Native Country</th>
<th>Race / Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher 1</td>
<td>14</td>
<td>M.Ed.</td>
<td>Yes</td>
<td>English</td>
<td>Nigeria</td>
<td>African-American</td>
</tr>
<tr>
<td>Teacher 2</td>
<td>21</td>
<td>B.S.</td>
<td>Yes</td>
<td>English</td>
<td>USA</td>
<td>Black</td>
</tr>
<tr>
<td>Teacher 3</td>
<td>4</td>
<td>M.Ed.</td>
<td>Yes</td>
<td>English</td>
<td>USA</td>
<td>Black</td>
</tr>
<tr>
<td>Teacher 4</td>
<td>24</td>
<td>M.Ed.</td>
<td>Yes</td>
<td>English</td>
<td>USA</td>
<td>Caucasian</td>
</tr>
<tr>
<td>Teacher 5</td>
<td>11</td>
<td>Ed.D.</td>
<td>*Yes</td>
<td>English</td>
<td>USA</td>
<td>Black</td>
</tr>
<tr>
<td>Teacher 6</td>
<td>2</td>
<td>M.Ed.</td>
<td>No</td>
<td>English/Spanish</td>
<td>USA</td>
<td>Caucasian</td>
</tr>
<tr>
<td>Teacher 7</td>
<td>6</td>
<td>M.Ed.</td>
<td>Yes</td>
<td>English</td>
<td>USA</td>
<td>Caucasian</td>
</tr>
<tr>
<td>Teacher 8</td>
<td>4</td>
<td>Ed.S.</td>
<td>Yes</td>
<td>English</td>
<td>USA</td>
<td>Caucasian</td>
</tr>
<tr>
<td>Teacher 9</td>
<td>2</td>
<td>Ph.D.</td>
<td>No</td>
<td>English/Spanish</td>
<td>USA</td>
<td>Hispanic</td>
</tr>
<tr>
<td>Teacher 10</td>
<td>11</td>
<td>M.Ed.</td>
<td>Yes</td>
<td>English/Hindu</td>
<td>India</td>
<td>Indian</td>
</tr>
<tr>
<td>Teacher 11</td>
<td>8</td>
<td>M.Ed.</td>
<td>Yes</td>
<td>English/Spanish</td>
<td>USA</td>
<td>Hispanic</td>
</tr>
</tbody>
</table>

Sampling Procedures

Participants for this study were purposefully chosen based on their relevance and experience with the issues surrounding the study. Most relevant to the issues are ESL teachers, ELL students, and administrators. ESL teachers and administrators work with ELLs daily and can contribute a wealth of knowledge to this study. ELLs are educated by ESL teachers daily and can provide insight into from the student perspective into the phenomenon of class placement and its effects on ELL student achievement in science.

The sample of teachers will consist of two 10th grade biology teachers (one who teaches sheltered ESL classes, and one who teaches non-sheltered general classes), and two 9th
grade physical science teachers (one teaches sheltered classes and the other teaches
general classes). These teachers were selected to participate in the study because they
work immediately with the student population being studied. The sample of students for
this qualitative case study will consist of 9th and 10th grade ELL students who scored
between 3 and 5 on the ACCESS English language assessment test. The school educates
448 ELL students; 264 of these students are 9th graders, 108 of these students are 10th
graders. Currently, of the school’s 264 ELL 9th grade students, 105 of those students
(40%) scored between 3 and 5 on the ACCESS test. Of the school’s 108 ELL 10th grade
students, 52 of those students (48%) scored between 3 and 5 on the ACCESS test. In
terms of class placement, students who score between 3 and 5 on the ACCESS test can be
placed in either a sheltered ESL science class or a non-sheltered general science class.
The administrator chosen for this study is experienced in working with ELLs and
assisting in defining the best classroom placement for each English Language Learner.
The researcher was able to gain insight and rationale for why students are placed in
sheltered classrooms.

Working with Human Subjects

Prior to conducting this study, the researcher obtained all necessary permissions
(school board, Clark Atlanta University Institutional Research Board (IRB), principal,
teacher/administrator, student, and parental (see appendices A, B, C, D, E, and F) to work
with the students. All students who met the researcher’s criteria were observed with their
teachers during class time. They also took a survey. In order to help the researcher obtain
more in depth information, a select group of students participated in a focus group. To
protect their identity, the researcher only identified participants (teachers, students, administrators) through the use of pseudonyms.

**Instrumentation**

This study obtained its data and information through several qualitative methods including document analyses, observations, student surveys, teacher and administrator interviews, and a student focus group. Under the guidance of the Clark Atlanta University Dissertation Committee, the researcher developed the instruments to be used in the study. These instruments included an observation analysis protocol, questions for the teacher and administrator interviews as well as those for the student focus group, and the questions for the student survey:

- The observation protocol, which was developed by the researcher, helped to streamline the observations into observable characteristics typical that are common in ESL classes and non-ESL classes.

- Interview questions helped the researcher gain a better understanding of the similarities and differences between sheltered ESL classes and non-ESL classes. The interviewer also gained insight into how ELLs performed in the two class settings.

- The student survey gave all students, regardless of their level of English language proficiency, the opportunity to share insight with the researcher on the environment in which they learned best—an ESL class or a non-ESL class. It also helped the researcher understand other factors that contribute to ELL student achievement in science.
• Focus group questions gave the researcher the opportunity to ask students open-ended questions.

The researcher also used students’ ACCESS test scores and semester final grades in science class. Student demographic information as well as class size and ELL student distribution data was obtained through the school’s electronic student database.

**Participants/Location of Research**

Study participants consisted of all current educators and students at a school in a local county. The educators varied in age, years’ experience teaching, and gender. The students varied in ethnicity, age, and gender. Study participants were easily accessible because the researcher is an educator at the school in which the study was conducted. The participants were purposefully selected by the researcher in order to meet the aforementioned study criteria.

**Data Collection Procedures**

The researcher began the research process by first obtaining the ACCESS scores of all 9th and 10th grade students in the school. The researcher also obtained each teacher participating in the study’s class rosters. The researcher next compared the class rosters to ACCESS scores in order to identify those students that met the criteria to participate in the study. Based on the number of eligible participants in each class, the researcher chose classes to observe. Class rosters also helped the researcher assess class size. Prior to beginning the observation and interviewing process, the researcher met with the teachers to give them an overview of the process, and go over both the consent form and the observation protocol instrument. Next, the researcher met with students taking the survey.
and participating in the focus group to explain the research process and gave them consent forms. At that time, the researcher instructed students that in order for them to participate in the study, they must return the parent consent form prior to taking the survey. Observations were completed using the observation protocol created by the researcher. Once all observations were completed, the researcher determined emergent themes for both sheltered ESL classes and non-ESL classes. Immediately following each observation, the researcher administered the survey to students who returned the parental consent form. The survey, which was administered through SurveyMonkey, consisted of 10-15 questions, and took students about 10-15 minutes to complete. To compensate for language barriers, the survey was administered in the students’ native languages. Next, the researcher conducted a document analysis of each teacher participants’ lesson plans. The lesson plans’ analyses were compared to the observation, in search of emergent themes, similarities, and differences. The researcher then conducted interviews with teacher and administrator study participants. Interviews consisted of 6-8 questions and lasted no more than 15 minutes each. Next, with the help of teacher participants and the participating administrator, the researcher selected a heterogeneous group of students that participated in the focus group. The focus group consisted of 10 students (2 from each class observed) of various ethnicities and nationalities. Focus group participants were asked between 6-8 open-ended questions, which took place during lunch, and lasted about 20 minutes. Both the interviews and focus group were audio recorded. Finally, the researcher obtained and analyzed student participants’ final grades in science class. Final
grades, along with all other data collected, were used to determine the impact that class placement has on ELL student achievement in science.

**Statistical Application**

The Statistical Package for the Social Sciences (SPSS) was used to analyze the data collected in this study. Descriptive statistical analysis was used to analyze quantitative data from the student survey. The following statistical procedures were used: means and standard deviation are conducted to demonstrate that each variable has enough variation to allow for correlation analysis.

**Description of Data Analysis Methods**

Qualitative research aims to reveal notions that helped the researcher gain a better overall understanding of the big picture. By utilizing the data collected to depict the phenomenon and what this implies, the researcher answered the overarching questions of the study and used this information to draw a conclusion. This study consisted of several qualitative methods of data collection including observations, interviews, document analyses, and a focus group. The data for this study were analyzed as follows:

- Reviewed student ACCESS score reports to determine which students would be used in the study.
- Reviewed teacher class rosters to determine which class contained most of the target population and choose those for observation.
- Observation field notes were analyzed, coded, and categorized to determine emergent themes.
• Document analyses of teacher lesson plans were analyzed, compared to observation field notes, coded and categorized to determine emergent themes.

• Teacher and administrator interviews were transcribed, coded and categorized to determine emergent themes.

• Student surveys were analyzed, coded, and categorized to determine emergent themes.

• Student focus group were transcribed, coded and categorized to determine emergent themes.

• At the end of the semester, student academic records were analyzed. This information, along with all of the above-mentioned pieces of data, was used to determine the most academically lucrative placement for English Language Learners.

**Limitations of the Study**

The limitations of this study are as follows:

1. The study only focused on a select group of students at one school. The students come from various cultures and have varying levels of English language proficiency. Culture plays a major role in the amount and type (were students taught in their native language or in English) of schooling students received prior to coming to the United States. For example, students from Africa were taught in English and have a much easier time transitioning into American schools. Students from Asian countries typically attend school generally and although learned in their native language, attained academic
proficiency in English quickly. Because the amount of schooling students received in their native country varied drastically, students had varying levels of academic proficiency, which in turn has affected their academic achievement. While all students chosen for this study speak a language besides English at home, some of ELLs at were born in the United States and as a result are more proficient and able to better communicate than other students.

2. Because the study only focused on one subject (science), there are a very limited number of teachers who were included in the study.

3. Due to limited English language proficiency and other factors, parental involvement at the school was limited and could only be examined from the perception of the teacher.

Although parents at the school may want to be more active participants in their child’s education, most are reluctant to do so due to other obligations such as having to work to provide for their families, not being able to secure child care in order to attend a conference or event, not having adequate transportation to the school, etc. Despite having a parent center in the school, which provides parents with translators and other resources to help them be a part of their child’s education, parents are still reluctant to participate. These limitations were derived from the perceptions gained by the researcher by from teachers who participated in the study.

4. The researcher selected the lesson to be observed and informed the teachers of what the researcher would be looking for in during the observation.
5. The sample size (30 student participants) was very small.

6. Survey was administered in the days following the election of Donald Trump as president of the United States.

Due to our country’s political climate in reference to immigrants, study participants may have feared deportation and questioned their futures in the United States.

7. Study only included student participants whose ACCESS scores were in the middle range (between 3-5); students who scored above and below this range were not included.

8. Although there are four administrators at the school, only one was interviewed for this study. As a result, some administrator responses had to be inferred.

9. The researcher is an employee at the school.

At the school chosen for this study, there were only 11 science teachers. Of the twelve science teachers, only 6 of those science teachers were ESL certified. The researcher was one of those 6 teachers.

**Reliability and Validity**

Validity refers to whether the findings of a study are true and certain—true and certain in a sense the research findings both accurately reflect the situation and are supported by the evidence. Triangulation is a method used by qualitative researchers to check and establish validity in their studies by analyzing a research question from multiple perspectives. For the purposes of this case study, methodological triangulation, which involves the use of multiple qualitative methods to study a program, was used to validate the study (Guion, 2013). This case study consists of an interview, a focus group,
several document analyses, and an observation as methods of data collection. To ensure that all data collected is pertinent to the study, each method of data collection is based on current WIDA standards. Comparing the results of these methods should reveal similar findings.

Reliability can be defined as the repeatability of a particular set of research findings, or how accurately they would be repeated in a second identical piece of research (The Association for Qualitative Research, 2013). The reliability of this case study was enhanced by standardizing data collection techniques and their protocols, and careful documentation of all aspects and data concerning this study.

Summary

This chapter reviewed the research design. Through the use of a qualitative case study, the researcher examined the relationships between the independent variables (cognitive academic language proficiency, attendance, class size, teacher-student relationship, teacher competencies in ELL strategies, assignments, parental involvement, study habits, immigration requirements, and classroom placement), demographic variables (age and gender), and the dependent variable of ELL student achievement in science. The procedures for collecting, transcribing, analyzing, and interpreting the information gathered throughout the study were presented.
CHAPTER V
ANALYSIS OF THE DATA

Introduction

Using several variables, this study aimed to determine the most academically
lucrative classroom setting for English language learners. It was built around five types of
evidence—class observations (Appendix G), teacher lesson plan template (Appendix H),
student survey (Appendix I), teacher and administrator interviews (appendices J and K),
and a focus group (Appendix L)—that helped the researcher gain insight in determining
class placement for ELLs in science (see Table 3).

Table 3

Research Questions Used to Determine Class Placement for ELLs in Science

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Observations</th>
<th>Document Analyses</th>
<th>Surveys</th>
<th>Teacher Interviews</th>
<th>Admin Interview</th>
<th>Focus Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RQ3</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ4</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>RQ5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>RQ6</td>
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<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RQ7</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RQ8</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Table 3 (continued)

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Research Method</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observations</td>
<td></td>
</tr>
<tr>
<td>RQ9</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>RQ10</td>
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<td>X</td>
</tr>
<tr>
<td>RQ11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RQ12</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

The evidence was collected during the fall semester of the 2016-17 school year at a school located in suburban Atlanta, GA. According to the data collected, of the 12 original themes, four had the most significant impact on the achievement of English Language Learners in science: class placement, cognitive academic language proficiency (CALP), attendance, and teacher and student relationship. The findings are presented based on these four themes. Where necessary, pseudonyms, which preserve gender identification, have been used to identify participants.

Research for this qualitative study was conducted at a public high school located in suburb of Atlanta, GA. Opened in the 1950s, the school serves students from its surrounding neighborhoods. Although this school is a smaller high school, it is the most culturally diverse high school in the state of Georgia with students from 47 countries who speak 27 different languages. The student body is composed of 80% Hispanic, 11% black, 6% Asian, 1% white, and 1% other racial groups.
**Study Participants’ Data**

**Age, Attendance, Access Scores, and Nine Weeks Grades**

An analysis of students’ overall nine weeks grades in biology and physical science revealed that ELLs in a sheltered setting average 45% higher grade than those in a mainstream setting in biology and 14% higher grade than those in a mainstream setting in physical science. Data Table 4 further analyzes this demographic data. The table details age, attendance, grade and ACCESS data for male and female study participants.

**Table 4**

**ACCESS Data of Study Participants**

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Absences</th>
<th>Access Score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE #1 - NA</td>
<td>16</td>
<td>Female</td>
<td>3</td>
<td>3.9</td>
<td>79</td>
</tr>
<tr>
<td>BE#2 – LA</td>
<td>19</td>
<td>Male</td>
<td>7</td>
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<td>83</td>
</tr>
<tr>
<td>BE#3 – JC</td>
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<td>Male</td>
<td>9</td>
<td>4.0</td>
<td>75</td>
</tr>
<tr>
<td>BE#4 – JCC</td>
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<td>Male</td>
<td>2</td>
<td>4.8</td>
<td>83</td>
</tr>
<tr>
<td>BE#5 – MF</td>
<td>14</td>
<td>Male</td>
<td>1</td>
<td>4.4</td>
<td>80</td>
</tr>
<tr>
<td>BE#6 – AR</td>
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<td>Male</td>
<td>17</td>
<td>3.7</td>
<td>77</td>
</tr>
<tr>
<td>BE#7 – KS</td>
<td>17</td>
<td>Male</td>
<td>2</td>
<td>3.9</td>
<td>72</td>
</tr>
<tr>
<td>BE#8 – ES</td>
<td>16</td>
<td>Male</td>
<td>5</td>
<td>4.8</td>
<td>82</td>
</tr>
<tr>
<td>BE#9 – AT</td>
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<td>2</td>
<td>4.9</td>
<td>89</td>
</tr>
<tr>
<td>BE#10 – OV</td>
<td>15</td>
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<td>2</td>
<td>3.6</td>
<td>85</td>
</tr>
<tr>
<td>BE#11 – SV</td>
<td>15</td>
<td>Male</td>
<td>1</td>
<td>3.5</td>
<td>75</td>
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</tbody>
</table>

Overall Nine Weeks Grade Class Average – 80 B

<table>
<thead>
<tr>
<th>Grade Average Female – 84 B</th>
<th>Absence Average</th>
<th>Overall Absence Average – 5 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female – 3 Days</td>
<td>Grade Average</td>
<td>Male – 79 C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade Average Female – 84 B</th>
<th>Absence Average</th>
<th>Overall Absence Average – 5 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female – 3 Days</td>
<td>Grade Average</td>
<td>Male – 79 C</td>
</tr>
</tbody>
</table>
Table 4 (continued)

### Biology

<table>
<thead>
<tr>
<th>Name</th>
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<th>Gender</th>
<th>Absences</th>
<th>Access Score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>B#1 – JB **</td>
<td>16</td>
<td>Male</td>
<td>4</td>
<td>3.8</td>
<td>70</td>
</tr>
<tr>
<td>B#2 – JR **</td>
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<td>Male</td>
<td>35</td>
<td>3.1</td>
<td>32</td>
</tr>
<tr>
<td>B#3 – LV **</td>
<td>17</td>
<td>Female</td>
<td>17</td>
<td>3.0</td>
<td>34</td>
</tr>
<tr>
<td>B#4 – WV **</td>
<td>16</td>
<td>Male</td>
<td>8</td>
<td>3.8</td>
<td>39</td>
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</tbody>
</table>

Overall Nine Weeks Grade Class Average – 44 F

<table>
<thead>
<tr>
<th>Grade Average Female – 34 F</th>
<th>Absence Average</th>
<th>Grade Average</th>
<th>Absence Average Female – 17 Days</th>
<th>Male – 47 F</th>
<th>Average Male – 16 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Absence Average – 16 Days</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Physical Science ESL

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Absences</th>
<th>Access Score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE#1 – JA</td>
<td>17</td>
<td>Male</td>
<td>12</td>
<td>3.8</td>
<td>78</td>
</tr>
<tr>
<td>PE#2 – MA</td>
<td>14</td>
<td>Female</td>
<td>6</td>
<td>3.8</td>
<td>82</td>
</tr>
<tr>
<td>PE#3 – MG</td>
<td>16</td>
<td>Male</td>
<td>1</td>
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<td>80</td>
</tr>
<tr>
<td>PE#4 – IJ</td>
<td>16</td>
<td>Female</td>
<td>8</td>
<td>4.9</td>
<td>91</td>
</tr>
<tr>
<td>PE#5 – AJ</td>
<td>16</td>
<td>Female</td>
<td>2</td>
<td>3.3</td>
<td>77</td>
</tr>
<tr>
<td>PE#6 – DK</td>
<td>16</td>
<td>Female</td>
<td>5</td>
<td>4.5</td>
<td>92</td>
</tr>
<tr>
<td>PE#7 – GM</td>
<td>15</td>
<td>Male</td>
<td>1</td>
<td>3.2</td>
<td>76</td>
</tr>
<tr>
<td>PE#8 – MP</td>
<td>15</td>
<td>Male</td>
<td>11</td>
<td>3.4</td>
<td>74</td>
</tr>
<tr>
<td>PE#9 – ER</td>
<td>18</td>
<td>Male</td>
<td>16</td>
<td>3.3</td>
<td>81</td>
</tr>
<tr>
<td>PE#10 – AS</td>
<td>15</td>
<td>Male</td>
<td>6</td>
<td>3.8</td>
<td>80</td>
</tr>
</tbody>
</table>

Overall Nine Weeks Grade Class Average – 81 B

<table>
<thead>
<tr>
<th>Grade Average Female – 85 B</th>
<th>Absence Average</th>
<th>Grade Average</th>
<th>Absence Average Female – 5 Days</th>
<th>Male – 78 C</th>
<th>Average Male – 8 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Absence Average – 7 Days</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4 (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Absences</th>
<th>Access Score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>P#1 – SL</td>
<td>14</td>
<td>Female</td>
<td>4</td>
<td>4.8</td>
<td>77</td>
</tr>
<tr>
<td>P#2 – JL</td>
<td>15</td>
<td>Male</td>
<td>8</td>
<td>3.0</td>
<td>44</td>
</tr>
<tr>
<td>P#3 – AL</td>
<td>16</td>
<td>Male</td>
<td>5</td>
<td>3.0</td>
<td>72</td>
</tr>
<tr>
<td>P#4 – BR</td>
<td>16</td>
<td>Male</td>
<td>0</td>
<td>4.0</td>
<td>80</td>
</tr>
<tr>
<td>P#5 – IS</td>
<td>15</td>
<td>Female</td>
<td>2</td>
<td>3.3</td>
<td>79</td>
</tr>
</tbody>
</table>

**In addition to being ELLs, these students also had Individualized Education Plans (IEP) and were special education students. At the school in which this study was conducted, when an ELL student has an IEP, the student will be placed in a collaborative mainstream classroom in which there are two teachers – the subject’s teacher and a special education teacher. This may account for why their data is somewhat skewed from that of the students in the sheltered biology class.**

**Mainstream Biology Data Analysis**

The mainstream biology class chosen for this study was a collaboration class that consisted of both mainstream and special education students. All of the English language learners in the class were also special education students. The roster consisted of 28 students, 8 of which were special education. Of those 8 special education students, 5 were also ELLs whose ACCESS scores ranged from 1.9 or “entering/beginning” to 3.8 or “developing/expanding.”
The researcher began her examination of the mainstream biology class with an observation. The observation began with a visual inspection of the room prior to the students’ arrival. The class was filled with lots of information and visuals that could be viewed as distractions by some (front table cluttered with student materials and academic tools, fish tank filled with glowing fish, and scientific models of various items / concepts for biology). On the board, the lesson’s objectives as well as the day’s agenda were posted. The lesson was on ecology, which because it is a rather broad topic, the teacher had scaffolded the material into manageable segments for her student population.

Class began with Teacher BM standing in her door and greeting students as they entered. Students entered class and immediately began working on the bell ringer assignment. Once she had finished taking roll, Teacher BM asked for student volunteers to answer the bell ringer questions. Although several students volunteered to answer the questions, none of them were ELLs. Following the bell ringer, the teacher reviewed the previous night’s FLIP class assignment and provided clarification. The flipped classroom is an academic model in which the usual lecture and homework components of a course are turned around. In order to devote more time to hands-on activities, students view short video lectures and/or PowerPoint presentations prior to the class session (Educause Learning Initiative, 2012). While some students had questions, none of the ELLs asked Teacher BM questions. When all questions had been answered and misconceptions addressed, the teacher introduced a food chain modeling activity. As students completed the activity, Teacher BM circulated the room, monitoring progress and providing clarification for points of misconception. Students worked in heterogeneous groups to
complete the activity. Each group had a different food chain. When a sufficient amount of time had passed, the teacher asked each group choose a representative to present and explain their food chain to the class. None of the ELLs were chosen or volunteered to present to the class.

In analyzing Teacher BM’s lesson plan for the week in which the observation took place, the document highlighted the depth and rigor that she provides her students. It provided a skeleton of the topics covered during that week. The FLIP class was a key element throughout her lesson plan. Each night, students must complete a portion of the Ecology lesson for homework. That portion is then reviewed in class the next day before beginning an activity that ties all the concepts together. Her lesson plan was technology rich; Teacher BM incorporated technology into her class reviews as well as the daily lessons. Rather than lecture and note taking, Teacher BM’s lessons focused heavily on engaging students in the curriculum through hands-on activities.

Teacher BM’s interview provided further insight into her background and teaching methods. Her interview addressed the research questions as follows:

RQ1: How does classroom placement—mainstream non-ESL class versus sheltered ESL class—affect ELL student achievement in science?

Because all of her ELLs also have IEPs, Teacher BM feels they require extra attention that she finds difficult to give in such large class setting. While she tries to accommodate students in terms of language and IEP, she finds it difficult to do both at the same time.
RQ3: How does attendance affect ELL student achievement in science?

RQ10: How do immigration requirements (court dates, meetings, etc.) affect ELL student achievement in science?

Teacher BM sees attendance as a bigger issue than immigration. When asked if her students miss school due to immigration obligations, she stated that while students have missed, it has only been a few times. Overall, attendance is an issue because the families do not see education as a priority. Students are absent due to pregnancy or working late more often than because of immigration.

RQ5: How does a student’s relationship with their teacher affect ELL student achievement in science?

Teacher BM stated that a good relationship encourages students to do better, meaning that they will try harder when someone is actively monitoring their progress. “I try to have a good relationship with my students. I want them to trust me and feel that they can learn from me” (personal communication, October 31, 2016).

RQ6: How does the teacher’s competency in ELL strategies in the science curriculum content affect ELL student achievement in science?

RQ7: How do instructional strategies affect ELL student achievement in science?

Teacher BM is in her second year of teaching and despite working with ESL students in her mainstream classroom, she is currently not ESL certified. She reported not having any formal training/preparation to work with ELLs prior to coming to work at this school. For her, since all of her ELLs also have IEPs, she uses the same types of
strategies (graphic organizers, small group instruction, extended time, and modifying instruction) with her ELLs as she does with her special education students.

RQ8: How does parental involvement affect ELL student achievement in science?

Teacher BM reported no real barriers when dealing with her parents because she speaks enough Spanish to be able effectively communicate with them. She encourages her parents to actively monitor their student’s grade through Infinite Campus.

RQ9: How do study habits affect ELL student achievement in science?

When asked about study habits of her students, Teacher BM stated strongly that most students do not know how to study, nor do they attempt to study. To compensate for this, she reviews the previous day’s concepts at the beginning of class and does a review session before every test.

RQ12: How does gender affect ELL student achievement in science?

Teacher BM does not feel that gender plays a significant role in student achievement in science class. She also stated that most of her best students are female.

**Sheltered Biology Data Analysis**

The sheltered biology class chosen for this study consisted of 14 English language learners with ACCESS scores ranging from 2.4 or “beginning” to 4.9 or “expanding/bridging.” The researcher began her examination of the sheltered biology class with an observation. The observation began with a visual surveillance of the classroom. Teacher BS’ classroom had calm and inviting décor; the walls were clutter free with only the necessities posted. On the board were the content and learning objectives as well as the
state biology standards. Although the language objectives, as written on the board, were broad, they were embedded into the content and could be modified to fit the proficiency levels of all students. The lesson was on ecology, which can be a difficult topic for even native English speakers. The objectives were written on the board; students also read the objectives out loud at the beginning of the class. At the end of the class, the students “answered” the objectives as a form of review. Also on the board was the day’s agenda.

Class began with Teacher BS standing at the door and greeting students as they walked in. Students immediately went to their seats and began to work on the bell ringer activity, which was a review of the previous day’s lesson. Once the bell rang, Teacher BS entered the room and sat at her desk to take roll. She also set a timer and informed students of how much longer they had to work on the bell ringer assignment. Once the timer was done, the lesson on energy flow in the ecosystem (food chains and food webs) began.

During this observation, Teacher BS used many methods and strategies to insure her students gained an understanding of energy flow:

- The teacher used visuals such as PowerPoint presentation, Brain Pop videos with captioning, and concept maps to enhance the lesson.
- Prior to completing a food chain modeling activity, Teacher BS provided students with vocabulary and background information to help them in understanding the activity. Students wrote notes in their interactive notebooks.
• Students were grouped/seated based on their native languages and level of English proficiency. Students helped each other to understand the teacher’s instructions and what was expected on assignments.

• Students spoke to Teacher BS in Spanish and she answered them in English.

• The teacher gave sufficient wait time when asking students questions.

An analysis of Teacher BS’ lesson plans for the week of the observation detailed the curriculum, and the methods, and activities she used in working with her ELL students. They gave a skeleton of what was being taught and the methods used. When working with ELL students, it is important that the teacher introduces concepts in small, manageable chunks. Because students are trying to learn both the content and the English language, the traditional approach to teaching (lecturing) will not work for these students.

In BS’s lessons, she used a variety of methods. Because biology is a content-rich science, Teacher BS had to use some traditional lecturing. However, according to her lesson plan, the lectures were accompanied by PowerPoints, guided notes, and short videos that clarified concepts. Her lessons focused on drawing and labeling diagrams, creating concept maps, lab activities, group projects/activities, and daily review of key terms and concepts.

Teacher BS’s interview provided further insight into her background and teaching methods. Her interview addressed the research questions as follows:

RQ1: How does classroom placement—mainstream non-ESL class versus sheltered ESL class—affect ELL student achievement in science?

RQ4: How does class size affect ELL student achievement in science?
Teacher BS felt the biggest contributing factor to the achievement gap between ELLs and non-ELLs is class placement, especially in science. Even though she used the same basic lesson plan with both her ESL classes and her regular classes, she felt that the number of students in the class made it difficult to address all the ELL students’ individual needs. A mainstream class can have up to 36 students, while a sheltered class will never have more than 22 students without an assistant.

RQ2: How does a student’s level of cognitive academic language proficiency (CALP) affect ELL student achievement in science?

Because of overcrowding at the school, most mainstream classes at the school have ELL students in them. As a result, Teacher BS teaches both her sheltered and mainstream classes using the same methods. The only difference she reported is that with her sheltered classes, her pace is much slower and deliberate because she knows the students’ cognitive academic language proficiency (CALP) in science is not where it should be. Moreover, biology is a half-year course, meaning students only have 4 months to learn all biological concepts. For this reason, she can only use in depth strategies such as hands-on activities and labs if timing permits. She reports regularly using graphic organizers and interactive notebooks to help her students organize their biology thoughts.

RQ3: How does attendance affect ELL student achievement in science?

RQ10: How do immigration requirements (court dates, meetings, etc.) affect ELL student achievement in science?

Teacher BS reported that while in the past immigration has been a contributing factor to student attendance, currently this is not an issue. However, she also stated that
some students are excessively absent due to other reasons such as pregnancy, having to
work late to support themselves or their families, and a general lack of caring for their
education.

RQ5: How does a student’s relationship with their teacher affect ELL student
achievement in science?

Teacher BS felt that the relationship between teachers and students plays a major
role in students’ classroom performance. She reported that because she cares deeply for
her students, they perform for her.

RQ6: How does the teacher’s competency in ELL strategies in the science
curriculum content affect ELL student achievement in science?

Prior to working at this school, Teacher BS had no experience in working with
ELLs and outside of being able to speak Spanish, was not prepared to do so. She learned
strategies in dealing with ELLs through the SIOP training.

RQ8: How does parental involvement affect ELL student achievement in
science?

Because she is Hispanic (Puerto Rican), Teacher BS understands the culture and
the language of a majority of her students and their parents. She does not have to rely on
a translator to communicate with her parents. For her, getting the parents involved is
important to student achievement. As soon as an issue arises, either academic or
behavioral, she contacts her parents to solicit their assistance in achieving a solution.

RQ9: How do study habits affect ELL student achievement in science?
Teacher BS feels her students do not know how to study. For this reason, she gives them a study guide for every test and has weekly tutorial sessions. When she examines her test scores, it is evident that those who complete the study guides and attend tutorials achieve higher scores.

RQ12: How does gender affect ELL student achievement in science?

Teacher BS noted that her female students are generally more mature than her male students. As a result, they perform at higher levels than the male students. She feels the female students are more motivated to do well than the male students.

Mainstream Physical Science Data Analysis

The mainstream physical science class chosen for this study consisted of 14 students. Of those 14 students, 5 are ELLs with ACCESS scores ranging from 2.9 or “beginning/developing” to 4.8 or “expanding/bridging.” The researcher began her examination of the mainstream physical science class with an observation. The observation began with a visual surveillance of the classroom. The room was filled with lots of visuals and academic material that can be viewed as distractions to some (front table cluttered, lab equipment from previous lab on table, etc.). The lesson’s objectives were posted on the white board. The lesson was on nuclear energy; although the objectives were never explicitly stated, Teacher PM embedded them into the lesson so that students could better understand them.

Class began with Teacher PM standing in the doorway of the room greeting students as they entered. Once students entered the room, they immediately began working on the bell ringer/sponge assignment. While students completed this short task,
Teacher PM took roll. After taking the roll, Teacher PM asked for student volunteers to answer the bell ringer question. It was a Venn diagram comparing and contrasting fission and fusion. Each student volunteer went to the board and wrote one phrase to fill in the diagram. When Teacher PM realized that no ELLs volunteered to go to the board, he asked P#4 to go to the board. Although the student stated that all of his ideas had already been written on the board, Teacher PM encouraged the student to put a check next to an item he agreed with; P#4 obliged. Once all answers were on the board, Teacher PM had students to fill in/correct their diagrams in their notebooks. Following the bell ringer assignment, Teacher PM introduced the lesson’s new learning on fossils and carbon dating through a YouTube video. As they watched the video, students wrote down facts or concepts they were unaware of prior to viewing the video. Following the video, the teacher had each student to share something they learned from the video. Using the video to explain why scientists calculate half-life, Teacher PM then showed students how to calculate half-life. After trying a few problems together, Teacher PM gave students practice half-life problems to solve independently. He circulated the room, offering help when needed. Students were also allowed to ask other students seated around them for help. Once it seemed that most students had completed the practice problems, the teacher asked for volunteers to go to the board and show their answers. As students put up their answers, Teacher PM corrected and explained the students’ work to the class. Moreover, Teacher PM used various strategies to help all of his students (ELLs and non-ELLs) to understand the lesson:
• He spoke to students in both Spanish and English to ensure they had access to the concepts in a language they understood.

• Class was interactive in that teacher and students had constant dialogue about the concept.

• Teacher sat at the tables with students, making him readily assessable to students.

• Teacher used visuals such as PowerPoint and Internet videos to enhance the lesson.

An examination of Teacher PM’s lesson plans during the week of the researcher’s observation revealed that he follows the more traditional teaching methods. His lessons begin with an introduction of the new learning, either through lecture or a video, followed by a student-centered activity. The activities included analyzing articles, completing practice problems, and labs.

Teacher PM’s interview provided further insight into his background and teaching methods. His interview addressed the research questions as follows:

RQ2: How does a student’s level of cognitive academic language proficiency (CALP) affect ELL student achievement in science?

RQ7: How do instructional strategies affect ELL student achievement in science?

Because he feels that ELLs have less CALP, Teacher BM uses more pictures when working with them. However, he also stated that he does not really do anything
different when working with ELLs and non-ELLs because he believes that his strategies benefit all students.

RQ3: How does attendance affect ELL student achievement in science?

Teacher PM reported that attendance plays a major role in student achievement. He stated he has one student who is cognitively capable but is failing due to excessive absences.

RQ5: How does a student’s relationship with their teacher affect ELL student achievement in science?

When asked about how the relationship between a teacher and his/her students affect their achievement, Teacher PM stated that fostering a positive relationship with students can positively affect a student’s performance in a class. He develops this relationship through occasionally speaking to his students in Spanish.

RQ6: How does the teacher’s competency in ELL strategies in the science curriculum content affect ELL student achievement in science?

Although Teacher PM has taught college courses, he is only in his second full year of teaching at the high school level and also his second year working with ELLs. He feels that he was not adequately prepared to teach ELLs.

RQ8: How does parental involvement affect ELL student achievement in science?

Teacher PM reported taking the initiative to introduce himself to parents at the beginning each semester in the hopes that they aspire to work as a team in educating their student.
RQ9: How do study habits affect ELL student achievement in science?

Teacher PM felt that none of his students knew how to adequately study or take notes. For this reason, he demonstrates note taking to his students and tries to keep them organized.

RQ10: How do immigration requirements (court dates, meetings, etc.) affect ELL student achievement in science?

When asked if immigration obligations ever played a role in student achievement, Teacher PM stated that he was not aware of any students having dealings with immigration.

RQ12: How does gender affect ELL student achievement in science?

As far and gender and its impact on student achievement in science, Teacher PM stated that one of the reasons that he became a high school science teacher is his daughter. He wants girls to like and become more interested in science and strives to serve as inspiration to both his daughter and the young ladies in his class.

Sheltered Physical Science Data Analysis

The sheltered physical class chosen for this study consisted of 14 English language learners with ACCESS scores ranging from 1.9 or “entering/beginning” to 4.9 or “expanding/bridging.” The researcher began her examination of the sheltered physical science class with an observation. The observation began with a visual surveillance of the room. On the back wall of the room were student created posters explaining various physical science concepts. It was apparent that students often use illustrations to demonstrate mastery of the concepts. The daily agenda, which included the lesson’s
objectives, was posted on the front board. The lesson was on nuclear energy, which is difficult to explain in a way that students will understand. However, throughout the lesson, Teacher PS explained parts of the objective. As a check for understanding, students created posters that illustrated the objectives.

Class began with Teacher PS standing in the door and greeting her students as they entered the room. Students immediately took their seats and worked on the bell ringer sponge assignment. After taking the roll, Teacher PS asked for student volunteers to answer the bell ringer question. When no one volunteered, Teacher PS called on a young lady in the class. Although she had the correct answer, she could not explain the concept to the class. Teacher PS drew a picture to help students better understand. As she drew the picture, she asked various questions about the topic; each question further elaborated on the bell ringer question. Following the bell ringer, Teacher PS reviewed the day’s agenda. She began the next portion of the class with a video that introduced the day’s new learning—fission and fusion. She turned on the video’s captioning feature so that the students could also read the video’s dialogue. After the video, Teacher PS further elaborated on the concept of fission and fusion through a brief lecture. Following the lecture, students got into predetermined groups and created posters that compared and contrasted fission and fusion. As students worked, Teacher PS walked around monitoring progress and offering help where needed.

An examination of Teacher PS’s lesson plans for the week of the observation revealed that she consistently used hands-on activities to convey the difficult physical science concepts to her students. The lesson used modeling, practice problems, and
graphic organizers to help students grasp the concepts. Although her teaching is somewhat traditional, she regularly enhances her lessons through technology. Teacher PS’s lessons typically started with an opening assignment, followed by a video or a PowerPoint, then an engaging student activity and ended with an oral review.

Teacher PS’s interview provided further insight into her background and teaching methods. Her interview addressed the research questions as follows:

RQ1: How does classroom placement—mainstream non-ESL class versus sheltered ESL class—affect ELL student achievement in science?

RQ7: How do instructional strategies affect ELL student achievement in science?

When asked if there was a difference between her ELL students and her general (mainstream) students, Teacher PS stated she pushes her regular students much more than her ELLs. With her ESL classes, she focuses on vocabulary and often uses graphic organizers. Her pacing with her ESL class is slower and much more deliberate.

RQ3: How does attendance affect ELL student achievement in science?

Teacher PS felt that attendance plays a major role in the achievement of her ELLs. She stated, “You’ve got to be in school to learn the material, especially since we have half-year courses. Missing one day could mean missing half of a unit” (personal communication, November 4, 2016). She reported having students with chronic absences for various reasons.

RQ5: How does a student’s relationship with their teacher affect ELL student achievement in science?
Teacher PS often finds it difficult to develop a relationship with her students due to her accent. They see her as an ELL and sometimes feel she is not knowledgeable. However, once students get past her tough exterior, the relationship that develops positively affects students’ achievement.

RQ6: How does the teacher’s competency in ELL strategies in the science curriculum content affect ELL student achievement in science?

Teacher PS has been teaching 10 years, and has worked with ELLs for 4 years.

RQ8: How does parental involvement affect ELL student achievement in science?

Because she does not speak any Spanish, Teacher PS uses translators and her Spanish teaching coworkers to communicate with parents.

RQ9: How do study habits affect ELL student achievement in science?

Teacher PS reported that she does not think her students know how to study and even have trouble asking questions when they do not comprehend concepts.

RQ10: How do immigration requirements (court dates, meetings, etc.) affect ELL student achievement in science?

For Teacher PS, immigration obligations were not an issue.

RQ12: How does gender affect ELL student achievement in science?

Teacher PS teaches freshmen, whom she feels have yet to mature. Her female students generally perform better than her male students because the girls are more mature and focused. She feels it takes somewhat longer for boys to mature and become focused.
ESL Administrator Interview

The administrator chosen for this research, Administrator E, was a seasoned education veteran with 13 years of experience. Throughout the years, she served as a middle school English teacher, and a high school English teacher prior to becoming the ESL Coordinator at this high school. While this is Administrator E’s second year at the school, it is her first year as ESL coordinator. Working with the students of this high school was her first time being an administrator over such a large population of ELL students. Nonetheless, she learned to adapt, adjust, and to communicate with parents and students.

According to Administrator E, the largest contributing factor to the achievement gap between ELLs and other students is student and teacher motivation. She stated,

Often, teachers are the students’ biggest cheerleaders. Some of our students come to this country by themselves and must quickly become adults at young ages. Having to go to work to pay bills to support their families often trumps coming to school. That’s our biggest battle. (Personal communication, November 11, 2016)

In terms of CALP, she also stated that some students come to the school with very little education prior to entering the United States. She stated,

We are great at what we do, but it’s stressful when teachers have a class full of students who cannot read or speak in English or any language for that matter. But in the end the stress is worth it when a kid can ask you a question or crack a joke in English. It’s the little things that make it worth it. (Personal communication, November 11, 2016)
According to Administrator E, to specifically address the achievement gap, the school has several initiatives:

- The school is in the process of implementing the RTI (Response to Intervention), which addresses students who chronically fall behind and fail classes.
- Teachers offer tutoring sessions before and after school.
- The school has implemented the FLP (Flexible Learning Program) in which tutoring/extra help is built into students’ daily schedules. For this, students are pulled from their elective classes 2 days a week for remediation in math.

Moreover, since ELL students have limited English language proficiency, teaching in the traditional fashion will not work for ELLs. Administrator E reported that teachers learn various strategies and best practices for working with ELL students through the Sheltered Instruction Observation Protocol (SIOP) training. Besides the training, teachers rely on each other for insight on best practices for educating ELL students. Says Administrator E,

Even though teachers may have students who currently coded ESL or have exited out of the ESOL program, the SIOP strategies benefit all students, from your highest to your lowest. That helps the teachers with the international population as well as other students who have exited out of ESL program. (Personal communication, November 11, 2016)
When asked what her biggest area of concern was in terms of the school’s ELL population, Administrator E reported that students’ CALP in comparison to the rigor of the Milestones EOC tests causes her major concern. She stated, If a student speaks no English in August, when it is time to take the Milestones in December, I worry that they won’t have enough comprehension to earn a passing score. That’s not fair to our children. They should not be penalized for not understanding the language. (Personal communication, November 11, 2016)

**Focus Group of ELL Students**

The sample of students for this qualitative case study consisted of 9th and 10th grade ELL students who scored between 3 and 5 on the ACCESS English language assessment test (see Table 5). To gain insight into ELL education from the student perspective, the researcher conducted a focus group with 14 ELL students who scored on the upper end the all participants on the ACCESS test.

**Table 5**

*ACCESS Scores of Focus Group ELL Students*

<table>
<thead>
<tr>
<th>Sheltered Biology ELLs</th>
<th>Sheltered Physical Science ELLs</th>
<th>Mainstream Biology ELLs</th>
<th>Mainstream Physical Science ELLs *</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student</strong></td>
<td><strong>Access Score</strong></td>
<td><strong>Student</strong></td>
<td><strong>Access Score</strong></td>
</tr>
<tr>
<td>BE#2</td>
<td>4.8</td>
<td>PE#4</td>
<td>4.9</td>
</tr>
<tr>
<td>BE#4</td>
<td>4.8</td>
<td>PE#6</td>
<td>4.5</td>
</tr>
<tr>
<td>BE#8</td>
<td>4.8</td>
<td>PE#10</td>
<td>3.8</td>
</tr>
<tr>
<td>BE#9</td>
<td>4.9</td>
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</tbody>
</table>

* These students were chosen for convenience, because they were present on the day that the focus group was conducted.
During the focus group, students spoke about their experiences in ESOL education. When asked how they were prepared for schooling in the United States, half of the students reported that they have only attended school in the United States. Those who had attended school in other countries reported taking English language lessons in preparation for school in the United States.

The conversation then moved into their current ESL education experiences. Students reported a mix of classes some were sheltered (ESL) and some were mainstream (non-ESL). In an ESL setting, students receive accommodations that help them to become proficient in the curriculum. These modifications include extended time on assignments and tests, modifications to assignments, tests and instructions read to them in English, and the ability to use assistive devices such as translation dictionaries. Also, ESL teachers typically do not teach using traditional methods. According to the students in the focus group, ESL teachers rely on projects and hands-on activities to help students understand difficult concepts. However, when asked which type of classes they prefer, ESL or non-ESL, focus group members gave mixed reviews. Those who were in sheltered classes reported preferring sheltered classes because they are smaller, which allows them more individual instruction from their teachers. Those who were in mainstream classes reported preferring mainstream classes because they felt that mainstream classes are more challenging and the teachers treat them the same as they treat non-ESL students.

The conversation concluded with students answering questions about studying and immigration. When asked about studying for science class, students reported
studying / completing homework assignments 2-3 times a week. When asked if immigration affects their attendance, all reported not having any issues with immigration that would cause them to miss school.

Quantitative Survey Data

Sheltered (ESL) versus Mainstream Students (Regular)

The survey was administered to the targeted student population via Survey Monkey following each class observation. Comprised of 13 multipart questions, the survey aimed to answer and provide insight into research questions 2 (CALP), 5 (Student-Teacher Relationship), 6 (Teacher Competency in ELL Strategies), 7 (Instructional Strategies), 8 (Parental Involvement), 9 (Study Habits), and 10 (Immigration Obligations). Because there were no significant differences in survey results between the 2 subjects (Biology and Physical Science), the researcher chose to analyze the similarities and differences in results between sheltered and mainstream respondents; 21 students in sheltered science classes and 9 students in mainstream science classes took the survey.

Cognitive Academic Language Proficiency

Students were asked how well they “SWRL” (speak, write, read, listen) in English. The results were as follows:

Sheltered Respondents

Of the respondents, 67% reported speaking to their teachers in English all the time; only 19% reported speaking to others in English all the time (see Figure 2).
Figure 2. Sheltered respondents who speak to their teachers in English.

A vast majority of respondents reported being able to copy from the board (76%) and answer questions in English (67%) all the time (see Figure 3).

Figure 3. Sheltered respondents who are able to copy from the board.

A little less than half of the respondents (43%) reported being able to read and understand their science textbooks, while about half (52%) reported being able to read and understand books and magazines written in English all the time (see Figure 4).
Figure 4. Sheltered participants who are able to read and understand books and magazines written in English.

More than half of the respondents (57%) reported being able to understand their teachers when they speak in English. However, only 47% reported being able to understand others when they speak in English (see Figure 5).

Figure 5. Sheltered participants who are able to understand their teachers when they speak in English.
Mainstream Respondents

All of the mainstream respondents reported speaking to their teachers in English all the time, but only 44% speak to others in English all the time (see Figure 6).

![Bar chart showing percentage of mainstream respondents who speak to their teachers in English.]

**Figure 6.** Mainstream respondents who speak to their teachers in English.

Of the respondents, 55% reported being able to copy from the board in English all the time, while 67% reported being able to write the answer to a question in English all the time (see Figure 7).

![Bar chart showing percentage of mainstream respondents who are able to copy from the board in English.]

**Figure 7.** Mainstream respondents who are able to copy from the board in English.
Only 44% of the mainstream respondents reported being able to read and understand their science textbook in English all the time, while 78% reported being able to read and understand books and magazines in English all the time (see Figure 8).

![Figure 8: Mainstream respondents who are able to read and understand their science textbook in English.](image)

Of the respondents, 67% reported being able to understand their teachers when they speak in English all the time, while 78% reported being able to understand others when they speak in English all the time (see Figure 9).

![Figure 9. Mainstream respondents who are able to understand their teachers when they speak in English.](image)
Student-Teacher Relationship, Teacher Competency in EL Strategies, and Instructional Strategies

Students were asked how they felt about their relationship with their teacher, in terms of culture, helping them to understand assignments, the types of assignments given, and how their teachers make them feel in class. The results were as follows:

Sheltered Respondents

Of the sheltered respondents, only 43% felt that their teacher understood their culture, 33% reported that the teacher gave hands on assignments, and 38% felt that their teachers made them feel important to the class all the time. A little more than half of the sheltered respondents (62%) felt that their teacher helped them to understand their science assignments all the time (see Figure 10).

![Chart](chart.png)

*Figure 10. Sheltered respondents: Student-teacher relationship.*
Mainstream Respondents

Of the mainstream respondents, more than half, 56%, felt that their teacher understood their culture and that the teacher gave hands on assignments all the time. Many (67%) also felt that their teacher helped them to understand their science assignments all the time. A little less than half of the sheltered respondents (44%) felt that their teachers made them feel important to the class all the time (see Figure 11).

**Figure 11.** Mainstream respondents: Student-teacher relationship.
Parental Involvement

Students were asked how their parents participate in their schooling. The results were as follows:

Sheltered Respondents

The parents of sheltered students are reluctant to be active participants in their child’s education all the time. Only 10% reported that their parents attend conferences and 5% reported their parents help them with homework (see Figure 12).

![Figure 12. Sheltered respondents: Parental involvement.](image-url)
Mainstream Respondents

The parents of mainstream students are also reluctant to participate in their child’s education all the time. Only 22% reported that their parents attend conferences and 11% reported their parents help them with homework (see Figure 13).

![Figure 13. Mainstream respondents: Parental involvement.](image)

Study Habits

Students were asked if they read their science notes and complete assignments from science class. The results were as follows:

Sheltered Respondents

Sheltered respondents do not study (read notes) or complete assignments from class all the time. Only 15% reported reading over notes while 19% reported completing assignments from class (see Figure 14).
Mainstream Respondents

Mainstream respondents also do not study (read notes) or complete assignments from class all the time. Only 11% reported reading over notes while 33% reported completing assignments from class (see Figure 15).

Immigration Obligations

Students were asked questions relating to how immigration has affected their schooling. The results were as follows:
Sheltered Respondents

Immigration does not affect sheltered respondents’ education (see Figure 16). Most reported never having to miss school to fulfill immigration requirements (76%) and not being afraid of being caught by immigration (67%).

Mainstream Respondents

Immigration does not affect mainstream respondents’ education. Most, which is 78%, reported never having to miss school to fulfill immigration requirements and not being afraid of being caught by immigration (see Figure 17).
Figure 17. Mainstream respondents: Immigration obligations.

Summary

This chapter provided an analysis of the data collected in this research study. The analysis of data investigated the independent variables: class placement, cognitive academic language proficiency, attendance, class size, teacher and student relationship, teacher competency in ELL strategies, instructional strategies, parental involvement, study habits, immigration requirements, age, and gender, and the dependent variable—achievement of ELLs in science. This chapter also outlined how the qualitative and quantitative data related to the research questions. Also, the theoretical framework was imbedded through each research question. Because it allowed the researcher to envision the connections between all information collected in the quest to answer the research questions, a single case study approach was applied to the data.
CHAPTER VI

FINDINGS, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

What does the data imply about the effects of class placement and other factors on the achievement of English Language Learners in science? This section reframes the data collected in a structured response to each research question for this qualitative case study. Examining what was learned from the evidence collected, this section reconstructs the information from the previous section in the form of four themes that emerged from the data: class placement, cognitive academic language proficiency (CALP), attendance, and teacher and student relationship. The section concludes with an application section, which applies the four themes to the research questions asked at the beginning of this qualitative case study and the theoretical framework, and makes recommendations for further research.

Findings

The analysis of the data revealed that four variables, class placement, CALP, attendance, and student-teacher relationship, had the most significant impact on ELL student achievement in science. ELLs in sheltered science classes had a 45% higher 9-weeks grade average in biology and a 14% higher nine weeks grade average in physical science than their counterparts who were in mainstream classes. In general, those students with higher ACCESS composite scores (which relates to CALP) had higher nine weeks
averages. Those students who regularly attended classes also had higher nine weeks averages. Students who had a good working relationship with their teachers also had higher nine weeks grade averages.

Analyzing these findings in relation to the theoretical framework, both Krashen’s Second Language Acquisition Theory (2013) and Vygotsky’s Sociocultural Theory (1978) provide insight into these findings. According to Krashen’s Second Language Acquisition Theory’s five hypotheses, students acquire a second language through continuous exposure and scaffolding. When placed in a sheltered classroom, which is much smaller and more intimate than a mainstream classroom, ELLs are provided more opportunity to develop relationships with their teachers. More attention is paid to the quality of language development as it relates to the academic content as opposed to strictly focusing on the content. ESL teachers understand how to progressively throughout the semester introduce material to students in ways that are challenging but do not go beyond students’ abilities. For these reasons, students are more likely to attend classes regularly which leads to increased levels of achievement.

According to Vygotsky’s Sociocultural Theory (SCT), socialization plays a key role in the expansion of understanding. Learning occurs in two stages: first, through social interactions with others, and then within an individual’s own mentality. In the sheltered class setting, ELLs are provided with more opportunities to interact with the teacher as well as with each other. These social interactions serve two purposes: they provide ELLs with practice in speaking academic English and allow the relationship to develop between ELLs and their teachers. As the relationship develops, the teacher learns
ways to best meet the linguistic and academic needs of the students. Specifically, the teacher must assist students in developing academic language proficiency through vocabulary rich lessons while also increasing the student’s knowledge of subject based skills. In science, those skills include analyzing, hypothesizing, experimenting, problem solving, inferring, and predicting. As a result, ELLs CALP increases, which also increases achievement.

**Conclusions and Implications**

In this section, the researcher will explain the implications of those variables that had the most impact on this study. The data answered the research questions as follows:

**RQ1:** How does classroom placement—mainstream non-ESL class versus sheltered ESL class—affect ELL student achievement in science?

ELL students who were placed in sheltered ESL science classes achieved at higher rates than those in mainstream science classes. In sheltered classes, teachers utilized ESL strategies that helped students to achieve at the same rates as their mainstream peers. These strategies included modeling, graphic organizers, scaffolding information, and focusing heavily on science vocabulary. Teacher PM’s class was more teacher centered; he directed most of the activities the researcher observed with minimal student-to-student interaction. Teacher PE’s class was more student based; she introduced her activities and allowed students to direct their own learning while she monitored and provided support where needed. In learning to become more academically proficient in language, according to this study’s theoretical framework, it is important to provide students with the opportunity to practice and process new concepts. Moreover, by law,
sheltered class sizes cannot exceed 22 students. This smaller class size allows the teacher to give more individualized attention to students.

RQ2: How does a student’s level of cognitive academic language proficiency (CALP) affect ELL student achievement in science?

Cognitive academic language proficiency was measured using the study participants’ ACCESS test composite scores. All participants in the study had access scores ranging from 3, which is considered “developing” to 4.9, which is considered “expanding/bridging.” In comparing participants’ nine week averages to their ACCESS scores, in general, those with higher ACCESS scores also had higher nine weeks averages.

RQ3: How does attendance affect ELL student achievement in science?

In order to become proficient in a subject, a student must regularly attend classes. Participants with a high number of absences did not achieve at the same levels as their classmates who regularly attended classes. In comparing these class settings, attendance was a key factor in student achievement. While no class size for the classes used in the study exceeded 30 students, it was evident that students in the sheltered classes were more likely to attend classes on regularly. It can be implied that attendance is more proficient in sheltered classes because students feel more of a connection to the teachers and that their voices can be heard. Teacher BM’s ELL attendance rate implies that she does not have a relationship with her students. One student missed 45 days of class. The sheltered class setting levels learning making all students equal participants/contributors in class.
RQ4: How does class size affect ELL student achievement in science?

By law, sheltered class sizes cannot exceed 22 students. This allows the teacher to tailor his/her lessons to individual needs of the students and give students more one on one time with the teacher. The data revealed that participants in sheltered science classes benefitted from the smaller class size.

RQ5: How does a student’s relationship with their teacher affect ELL student achievement in science?

Before a student will ever learn anything from their teacher, the teacher must earn the students’ heart and trust. The data revealed that of the 4 teachers who participated in the study, 3 worked to develop relationships with their students. This was evident in the significant difference between students’ grades in Teacher BM’s class and those of her colleague, Teacher BE. In her interview, Teacher BM only reported trying to establish a relationship with her students, while Teacher BE reported using her knowledge of the Spanish language to develop relationships with her students. It can be implied that teachers should take the time to develop relationships with their students. Students are willing to work harder and perform for those that they feel have a vested interest in their future and well-being.

RQ6: How does the teacher’s competency in ELL strategies in the science curriculum content affect ELL student achievement in science?

Teachers at the school in which this study was conducted learn best practices in educating English Language Learners through the Sheltered Instruction Observation Protocol (SIOP) training. The district offers this training at various times throughout the
school year and any teacher, regardless of what population of students they work most closely with, can attend the training. Two (the sheltered/ESL teachers) of the four teacher participants in this study were trained through SIOP. When observing their classes, the researcher observed various SIOP strategies. Through SIOP, teachers are taught to encourage ELLs to “SWRL” (speak, write, read, and listen in English) daily. The sheltered teachers were observed "SWRL-ing" with their students; it was also evident in their lesson plans that students were required to SWRL regularly.

RQ7: How do instructional strategies affect ELL student achievement in science?

Through teacher observations, the researcher discovered that there was a difference in the instructional strategies employed by sheltered and mainstream teachers. Sheltered teachers use a gradual release model in which the teacher introduces a concept and gradually increases the students’ academic responsibilities in regards to the topic as the lesson progresses. Mainstream teachers, require more academically initially in regards to new concepts. For example, Teacher BM uses the flipped classroom model, which requires students to read and take notes on concepts prior to class. During class, Teacher BM provides a short review of the notes for clarification and moves quickly into activities that require students to understand what they read and took notes on the previous night. As a result, for those students in sheltered classrooms, instructional strategies had a significant and positive impact on ELL student achievement.

RQ8: How does parental involvement affect ELL student achievement in science?
The data revealed that parents do not regularly participate in their child’s education. Most study participants were self-motivated and as a result, parental involvement did not have a significant impact on ELL student achievement.

RQ9: How do study habits affect ELL student achievement in science?

The data revealed that study participants do not know how to properly study for science class. While students reported reading over their notes and completing assignments at home, their teachers felt that they (students) did not know how to study or properly ask for help / phrase the concepts they did not understand into questions. As a result, study habits did not have a significant impact on ELL student achievement.

RQ10: How do immigration requirements (court dates, meetings, etc.) affect ELL student achievement in science?

The data revealed that study participants’ education is not adversely affected by immigration requirements. However, because the study was conducted during the presidential election, participants may have taken this into consideration when answering survey questions. As a result, immigration requirements did not significantly impact ELL student achievement.

RQ11: How does a student’s age affect ELL student achievement in science?

Study participants ranged in age from 14-19 years old. The data revealed no significant differences in achievement in terms of age. As a result, age did not significantly impact ELL student achievement.

RQ12: How does gender affect ELL student achievement in science?
Of the 30 student study participants, only 9 (30%) were female. The data revealed those female students’ nine weeks averages were 6 points higher (78) than male students (72). Teacher interviews provided insight into this phenomenon; teachers reported that female students are more motivated than male students. As a result, gender did significantly impact ELL student achievement.

**Recommendations**

This qualitative case study was intended to be used as a tool for education professionals (teachers and administrators) to explore how to best meet the needs of ELL students through placement in the most conducive learning environment.

**Recommendations for ESL Science Teachers**

1. Design lessons allow students to “SWRL” (Speak, Write, Read, and Listen) in English on a daily basis.
2. Speak clearly and slowly, writing down any key terms mentioned so that students can make connections between what they read and what they hear.
3. Use lots of visuals such as Power Points and guided notes, videos, and graphic organizers to help students visually understand how concepts fit together.
4. Employ the use of interpersonal strategies in the classroom.
5. Allow students to use the Internet to research and explore topics. This allows them to research in their native language and translate the final product into English.
6. For students with very limited ELP, pair them with students who are more proficient in English.
7. Encourage them to speak and participate in class.

8. ESL classes should be highly structured; do the same basic routine on a daily basis. This repetition helps ELLs to focus on the content rather than worry about what will be done in class.

9. When questioning students, be sure to give adequate wait time to ELLs. It takes them longer to process questions and come up with an answer.

10. Have an ever-changing word wall in the classroom. Each week, as new concepts are introduced, add the lesson’s new vocabulary words to the wall and discuss how they relate to the previously learned.

**Recommendations for Administrators**

1. Recruit teachers who are both highly qualified and certified in ESL education.

2. In schools with high populations of ELLs, require all teachers to be trained in best practices and strategies of ELLs.

3. Provide faculty and staff with ongoing professional development to aid them in working with ELLs. Sessions should include cultural sensitivity training to ensure teachers understand how to develop meaningful relationships with their students.

4. Develop standards/criteria that helps to determine what science classes ELLs take and when as well as which class setting (sheltered or mainstream) is the most academically appropriate for each ELL.

5. Use data to drive instruction and all decisions as it relates to ELLs in science. For example, if a teacher works well with ELLs and has a proven track record
of increasing ELL student achievement in science, use that teacher for instruction with your lowest achieving ELLs.

6. In order to promote parental involvement, make school more accessible to ELL parents. This can be accomplished making by translators available to assist in meetings and having a community outreach program to teach parents how to understand and help their children be successful in school.

**Recommendations for Policy/Procedures**

1. In order to provide continuous improvement to ESL instruction, annual program evaluations should be conducted.

2. Modified class size considerations should be given to schools with a large population of English Language Learners.

3. Recruit teachers who are both highly qualified and certified in ESL education for schools with large populations of English Language Learners.

4. School boards and local districts should provide additional human and financial resources to support professional development for teachers in ESL instructional strategies.

5. Local school leaders should develop procedures to closely monitor the student performance of ELL students and provide students with the necessary support to increase achievement.

**Recommendations for Further Research**

1. Expand the study to include other schools with different student demographics.
2. Conduct the same student to determine how class placement affects ELL student achievement in other core subjects (math, English, and social studies).

3. Interview and/or conduct parent surveys to gain further insight into the effects of parental involvement on ELL student achievement.

4. Compare ELL student achievement in various academic settings such as private/public schools, large/small schools, rural/urban/suburban schools, etc.

5. Conduct a similar study that includes all levels of student achievement.

**Summary**

This qualitative case study was intended to be used as a tool for education professionals (teachers and administrators) to explore how to best meet the needs of ELL students through placement in the most conducive learning environment. My recommendations for the targeted audience focus on the teaching aspect of ESL science education. For teachers working in schools with ELLs, the researcher recommends that they take the methods, strategies, and suggestions in this study and other similar studies and modify them to fit their classrooms. No two classes are the same; it is important that teachers approach each ESL class differently, assessing the class to discover which strategies work best for those students. In working with ELLs, patience is key. One will try many strategies before discovering the one that works best. Although the journey may seem impossible, ESL science teachers should persevere, knowing that the students are depending on them to help them succeed.

While quite extensive, this case study did not explore all aspects of ESL science education. Further research can be done to examine how various cultures respond to
ESOL education. Comparing the different cultures could reveal patterns that correlate to how students adapt to schooling in the United States. One could also examine the different models of ESL science education within the constraints of this case study to discover the similarities and differences in the various ESL science education models. This study could be continued on a larger scale through conducting the same study at different schools. All schools treat ESL education differently; the experiences of others in similar situations could offer a different aspect on this case.
APPENDIX A

Permission from School Board to Conduct Research

May 20, 2016
Ms. A. Magee
7146 Stonington Drive
Atlanta, GA 30328

Reference: Sheltered Instruction vs. Mainstream Classroom – The Impact of Student Achievement and Other Variables on the Achievement of ELL Students in Science: Implications for Educational Leaders (File # 2016-007)

Dear Ms. A. Magee:

This letter is to inform you that your research proposal has been approved by the Department of Research, Assessments, and Grants for implementation in the DeKalb County School District (DCSD).

When you begin your research you must secure the approval of the principal/chief site administrator(s) for all schools named in the proposal. You should provide the application with all required attachments and this district approval letter to the principal(s) in order to inform their decision. Please remember the principal/chief site administrator has the final right of approval or denial of the research proposal at that site. In addition, note that teachers and others may elect not to participate in your research study, even though the district has granted permission.

Please remember, the last day to conduct your research in DCSD for the 2016-2017 school year is Friday, March 31, 2017. This approval is valid for one year from the date on this approval letter. Should there be any changes, addenda, design changes, or adverse events to the approved protocol, a request for these changes must also be submitted in writing to the DCSD Department of Research, Assessments, and Grants during this one year approval period. Changes should not be initiated until written approval is received. Further, should there be a need to extend the time requested for the project, the researcher must submit a written request for approval at least one month prior to the anniversary date of the most recent approval. If the time for which approval is given expires, it will be necessary to resubmit the proposal for another review by the DCSD Institutional Review Board.

Completed results are required to be submitted to the Department of Research, Assessments, and Grants.

Best wishes for a successful research project. Feel free to call 678.676.0325 if you have any questions.

Sincerely,
Knox Phillips
Knox Phillips
Director

R. Stephen Green
Superintendent

Michael J. Shaw
Michael J. Shaw
Coordinator II
APPENDIX B

Clark Atlanta University Institutional Review Board (IRB) Approval

CLARK ATLANTA UNIVERSITY
Institutional Review Board
Office of Sponsored Programs

May 8, 2016

Ms. Ariana Magee <ArianaMagee@yahoo.com>
   ArianaMagee@Students.cau.edu
School of Education,
Educational Leadership Dept.
Clark Atlanta University
Atlanta, GA 30314

RE: Sheltered Instruction vs. Mainstream Classroom — The Impact of Classroom Placement and Other Variables on the Achievement of ELL Students in Science: Implications for Educational Leaders.

Principal Investigator(s): Ariana Magee
Human Subjects Code Number: HR2016-4-649-1

Dear Ms. Magee:
The Human Subjects Committee of the Institutional Review Board (IRB) has reviewed your protocol and approved of it as exempt in accordance with 45 CFR 46.101(b)(2).
Your Protocol Extended Approval Code is HR2016-4-648-2/A
Type of Review: Expedited.

This permit will expire on May 7, 2017. Thereafter, continued approval is contingent upon the annual submission of a renewal form to this office.
The CAU IRB acknowledges your timely completion of the CITI IRB Training in Protection of Human Subjects — “Social and Behavioral Sciences Track”. Your certification is due for renewal before May 5, 2018

If you have any questions, please contact the IRB Office or Dr. Paul I. Musey, (404) 880-6829.

Sincerely:

Paul I. Musey, Ph.D.
Chair
IRB: Human Subjects Committee
cc: Office of Sponsored Programs

223 James P. Brawley Drive, S.W.  *  ATLANTA, GA 30314-4391  *  (404) 880-8000
   Formed in 1988 by consolidation of Atlanta University, 1865  and Clark College, 1869
APPENDIX C

Letter to Principal

Dear Principal:

I am currently a Doctoral Student at Clark Atlanta University. I am nearing the end of my degree by the completion of my dissertation. My dissertation is titled: Sheltered Instruction versus Mainstream Classroom – The Impact of Classroom Placement and Other Factors on the Achievement of English Language Learners in Science: Implications for Educational Leaders.

I would like to work in the school to conduct my study pending Clark Atlanta IRB approval and XXXX County Schools’ approval. I would like to work with thirty (30) ninth and tenth grade physical science and biology students and their teachers. I am aware that I have to obtain parental consent before working with the students. All students and teachers in the study will be given aliases to protect confidentiality and anonymity. I will need to review students’ ACCESS data and semester grades to help determine academic achievement. Additionally, I will need to observe the students interacting with their teachers during class time. I will also need to gather information from the teachers to help make my study cohesive.

I am interested in learning if class placement (sheltered ESL class versus mainstream class) has any effect on improving academic achievement. I look forward to speaking to you further about my project. My goal is not to be intrusive, but to gather evidence that leads to determining the most academically lucrative classroom setting for English Language Learners in science classes.

Thank you for your consideration to work in your school.

Ariana Magee
ESL Science Teacher, CKHS
Doctoral Candidate, Clark Atlanta University
APPENDIX D

Teacher/Administrator Consent Form

Sheltered Instruction versus Mainstream Classroom - The Impact of Classroom Placement and Other Factors on the Achievement of English Language Learners in Science: Implications for Educational Leaders

You are invited to be in a research study of the academic achievement of English Language Learners in science. You were selected as a possible participant because you work closely with English Language Learners. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by Ms. Ariana Magee, a doctoral candidate at Clark Atlanta University.

Background Information
The purpose of this study is to examine ELL students’ placement – sheltered ESL class or non-sheltered mainstream class – and determine if there is a difference in their levels of achievement based on placement. Also, if there is a difference, the researcher will determine which environment is the most promising for ELL students.

Procedures
If you agree to be in this study, we would ask you to do the following things:

• Allow the researcher to analyze your lesson plans and student records.
• Participate in an interview.
• Help the researcher identify students to participate in a focus group.
• Allow the researcher to observe your class for 30 minutes.
• Administer a survey to your students.

Confidentiality
The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a participant. Research records will be kept in a locked file; only the researchers will have access to the records. Only the researcher will have access to recorded interviews and observations. All data will be destroyed after three years.
Voluntary Nature of the Study
Your decision whether or not to participate will not affect your current or future relations with the researcher, or Clark Atlanta University.

Contacts and Questions
The researcher conducting this study is Ms. Ariana Magee. If you have questions later about the research, you may contact the researcher at: Phone: (504) 460-6283

You will be given a copy of this form to keep for your records.
Statement of Consent: I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature __________________________________________
Date: ________________________________

Signature of Investigator ________________________________
Date: ________________________________
APPENDIX E

Student Consent Form

Sheltered Instruction versus Mainstream Classroom - The Impact of Classroom Placement and Other Factors on the Achievement of English Language Learners in Science: Implications for Educational Leaders

You are invited to be in a research study of the academic achievement of English Language Learners in science. You were selected as a possible participant because you are an English Language Learner. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by Ms. Ariana Magee, a doctoral candidate at Clark Atlanta University.

Background Information
The purpose of this study is to examine ELL students’ placement – sheltered ESL class or non-sheltered mainstream class - and determine if there is a difference in their levels of achievement based on placement. Also, if there is a difference, the researcher will determine which environment is the most promising for ELL students.

Procedures
If you agree to be in this study, we would ask you to do the following things:
- Complete a survey online through survey monkey.
- Participate in a focus group.
- Be observed in your classroom.

Confidentiality
The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a participant. Research records will be kept in a locked file; only the researchers will have access to the records. Only the researcher will have access to recorded interviews and observations. All data will destroyed after three years.

Voluntary Nature of the Study
Your decision whether or not to participate will not affect your current or future relations with the researcher, or Clark Atlanta University.
Contacts and Questions
The researcher conducting this study is Ms. Ariana Magee.
If you have questions later about the research, you may contact the researcher at: Phone: (504) 460-6283

You will be given a copy of this form to keep for your records.
Statement of Consent: I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature ________________________________
Date: __________________

Signature of Investigator ________________________________
Date: __________________
APPENDIX F

Parental Consent Form

Sheltered Instruction versus Mainstream Classroom - The Impact of Classroom Placement and Other Factors on the Achievement of English Language Learners in Science: Implications for Educational Leaders

Your child has been invited to be in a research study of the academic achievement of English Language Learners in science. Your child was selected as a possible participant because he/she is an English Language Learner. We ask that you read this form and ask any questions you may have before allowing your child to be in the study.

This study is being conducted by Ms. Ariana Magee, a doctoral candidate at Clark Atlanta University.

Background Information
The purpose of this study is to examine ELL students’ placement – sheltered ESL class or non-sheltered mainstream class - and determine if there is a difference in their levels of achievement based on placement. Also, if there is a difference, the researcher will determine which environment is the most promising for ELL students.

Procedures
If you agree to be in this study, we would ask your child to do the following things:

- Complete a survey online through survey monkey.
- Participate in a focus group.
- Be observed in your classroom.

Confidentiality
The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a participant. Research records will be kept in a locked file; only the researchers will have access to the records. Only the researcher will have access to recorded interviews and observations. All data will be destroyed after three years.

Voluntary Nature of the Study
Your decision whether or not to participate will not affect your current or future relations with the researcher, or Clark Atlanta University.
Contacts and Questions
The researcher conducting this study is Ms. Ariana Magee.
If you have questions later about the research, you may contact the researcher at: Phone: (504) 460-6283

You will be given a copy of this form to keep for your records.
Statement of Consent: I have read the above information. I have asked questions and have received answers. I consent to my child’s participation in the study.

Signature ______________________________________
Date: __________________

Signature of Investigator ______________________________________
Date: __________________
APPENDIX G

Class Observations

Essential Questions When Observing ESOL Class

You have been chosen to participate in this study because you work closely with English Language Learners. Participation is optional; before being observed, you must submit your signed consent form.

1. Are the language objectives embedded into content and appropriate proficiency level for students?

2. What are the content objectives? Are the content objectives presented to students in a way that they can understand?

3. Are the state standards posted? How do they correlate to the lesson? Do students understand the state standards?

4. How is students’ culture integrated into the lesson?

5. What methods does the teacher use to communicate with students?

6. Does the teacher use any visuals to enhance the lesson?

7. How is reading, writing, listening and speaking integrated into the lesson?

8. When asking students questions, does the teacher give wait time?

9. How does the teacher make the connection between spoken words and their written forms?

10. In what ways does the teacher connect with students? Can students relate to the teacher?
## APPENDIX H

Lesson Plan Template

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<td><strong>Unit Name</strong></td>
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<td><strong>Essential Questions</strong></td>
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<td><strong>Key Standards</strong></td>
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<td><strong>Unit Content Objectives</strong></td>
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<td><strong>Language Objectives</strong></td>
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<td><strong>Key Vocabulary</strong></td>
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<td><strong>SPONGE ENGAGEMENT</strong></td>
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<td>The hook - directly aligned with the standards for the day and builds on a student's background knowledge by either linking to prior experiences or learning. Include the following: What the student does, what the teacher does, what probing questions you will ask. Include materials and resources</td>
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<td><strong>EXPLAIN</strong></td>
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<td>(Teacher uses Instructional Strategies) Include the following: What the student does, what instructional strategies of RIGOR and DOK you will use to direct the focus of the lesson, what probing questions you will ask. Include materials and resources</td>
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<td>Work Period (30-45 min)</td>
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<td>EXPLORE and ELABORATE</td>
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<td>Instructional strategies of RIGOR and DOK allow students to have hands-on opportunities to investigate concepts, to apply the concept and to take it to the abstract. Include the following: What the student does, what the teacher does, what probing questions you will ask. Over each unit, the work periods should reflect a variety of assignments, multiple intelligences, learning styles, and higher-order activities. Include materials and resources.</td>
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<td>CLOSING (15-20 min)</td>
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<td>EVALUATE</td>
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<td>Can be either formative or summative demonstrating RIGOR and DOK; sum up the learning, key points, and standards—exit tickets, etc. Include materials and resources</td>
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<td>Homework:</td>
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</table>
# TEACHER NOTES:
How do I know if the students learned the information today? Which students mastered the instructional goal? Which students need more assistance in mastering the instructional goal?

## DIFFERENTIATION STRATEGIES
Meet Diverse Learner Needs (ELL, Special Services, Extended Learning Activities for those who master the standard early)

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<th>Monday</th>
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</table>

- **Lecture**
- **Demonstrate/Model**
- **Guided Practice**
- **Discuss/Question**
- **Cooperative Groups**
- **Class Work**
- **Independent Work**
- **Homework**
- **Student Exploration**
- **Charting Responses**
- **Video**
- **Technology**
- **Audio**

## Student Learning Activities
Check all that apply.

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<td>Processes</td>
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### Marzano’s Essential 9 (Highlight Strategies Used)
- Identifying Similarities and Differences
- Summarizing and Note-taking
- Homework and Practice
- Nonlinguistic Representations
- Cooperative Learning Setting
- Objectives and Providing Feedback
- Generalizing and Testing Hypotheses
- Cues, Questions, and Advance Organizers

### Multiple Intelligence (Highlight Intelligences Used)
- Verbal-Linguistic
- Musical
- Bodily-Kinesthetic
- Logical-Mathematical
- Visual-Spatial
  - Interpersonal
  - Intrapersonal
  - Naturalistic

### Educational Mastery Using Rigor:

<table>
<thead>
<tr>
<th>LEVEL 1: KNOWLEDGE</th>
<th>LEVEL 2: COMPREHENSION</th>
<th>LEVEL 3: APPLICATION</th>
<th>LEVEL 4: ANALYSIS</th>
<th>LEVEL 5: SYNTHESIS</th>
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APPENDIX I

ELL Student Survey

You have been chosen to participate in this study because you are an English Language Learner. Participation is optional; before completing this survey, you must submit your signed parental consent form. Please answer each question below truthfully. There is no right or wrong answer.

1. Are you male or female?
   a. Male
   b. Female

2. What is your age?
   a. 14
   b. 15
   c. 16
   d. 17
   e. 18 or older

3. Besides English, what language do you mainly speak at home?
   a. Non-American English
   b. Spanish
   c. Chinese
   d. Bengali
   e. Vietnamese
   f. Bangla
   g. Amharic
   h. French
   i. Mandinka
   j. Thai
   k. Hindi

4. What grade are you in?
   a. Freshman / 9th grade
   b. Sophomore / 10th grade
   c. Junior / 11th grade
   d. Senior / 12th grade
5. Which science class are you taking? Is it general or ESL?
   a. Physical Science – General
   b. Physical Science – ESL
   c. Biology – General
   d. Biology – ESL

6. How well do you “SWRL” in English?
   a. How are your speaking skills in English?
      i. I speak to my teacher in English.
         Never □  Sometimes □  Most of the time □  All of the time □
      ii. I speak to others (friends, family, community members) in English.
          Never □  Sometimes □  Most of the time □  All of the time □

   b. How are your writing skills in English?
      i. I can copy from the board or a book in English.
         Never □  Sometimes □  Most of the time □  All of the time □
      ii. I can write an answer to a question in English.
          Never □  Sometimes □  Most of the time □  All of the time □

   c. How are your reading skills in English?
      i. I can read and understand my science textbook in English.
         Never □  Sometimes □  Most of the time □  All of the time □
      ii. I can read and understand books and magazines in English.
          Never □  Sometimes □  Most of the time □  All of the time □

   d. How are your listening skills in English?
      i. I understand my teacher when she speaks in English.
         Never □  Sometimes □  Most of the time □  All of the time □
      ii. I understand other people when they speak in English.
          Never □  Sometimes □  Most of the time □  All of the time □

7. How is your relationship with your science teacher?
   a. My teacher understands my culture.
      i. Never □  Sometimes □  Most of the time □  All of the time □
   b. My teacher helps me to understand my science assignments.
      i. Never □  Sometimes □  Most of the time □  All of the time □
c. My teacher gives me hands-on assignments.
   i. Never □ Sometimes □ Most of the time □ All of the time □

d. My teacher makes me feel like I am an important part of the class.
   i. Never □ Sometimes □ Most of the time □ All of the time □

8. How do your parents participate in your schooling?
   a. My parents attend parent conferences.
      i. Never □ Sometimes □ Most of the time □ All of the time □

   b. My parents help me with my homework.
      i. Never □ Sometimes □ Most of the time □ All of the time □

9. How do you study for science class?
   a. I read over my science notes.
      i. Never □ Sometimes □ Most of the time □ All of the time □

   b. I complete my assignments from class.
      i. Never □ Sometimes □ Most of the time □ All of the time □

10. How does immigration (ICE – Immigration and Customs Enforcement) affect your education?
    a. I miss school to go to court for immigration.
       i. Never □ Sometimes □ Most of the time □ All of the time □

    b. I am afraid of being caught by immigration.
       i. Never □ Sometimes □ Most of the time □ All of the time □
APPENDIX J

Teacher Interview Questions

You have been chosen to participate in this study because you work closely with English Language Learners. Participation is optional; before participating in interview, you must submit your signed consent form. Please answer each question truthfully. There is no right or wrong answer.

1. How long have you been teaching full time? How long have you been teacher of ELLs?

2. What is the difference in pedagogy in dealing with an ELL student and a general education student in terms of teaching? Mentoring?

3. In terms of culture, what barriers do you encounter in dealing with parents (language, academic beliefs, attendance, etc.)?

4. As a teacher, what steps have you taken to help parents become more involved in their children’s education?

5. How does the relationship that develops between you and your students affect their achievement? Please explain.

6. Has your relationship with a student ever positively or negatively affected a student’s performance in class?

7. What are your perceptions of gender and its impact on student achievement in science?

8. What factors do you feel contribute to the achievement gap between ELL students and non-ELL students? Why?

9. What do you do in your classroom to address the achievement gap and ensure all of your students are learning?

10. Do you feel that your students know how to study? What steps have you taken to help students learn how to properly study?
11. Do your students miss days due to immigration obligations? How do these obligations affect your students?

12. In what ways were you prepared to deal with the issues associated with servicing a high ELL population?

13. What is your biggest area of concern when dealing with ELL students?

14. As a teacher dealing primarily with ELLs, what has been your greatest success? Biggest failure?
APPENDIX K

Administrator Interview Questions

You have been chosen to participate in this study because you work closely with English Language Learners. Participation is optional; before participating in interview, you must submit your signed consent form. Please answer each question truthfully. There is no right or wrong answer.

1. What is the difference between dealing with an ELL student and a non-ELL student?

2. In terms of culture, what barriers do you encounter in dealing with parents (language, academic beliefs, attendance, etc.)?

3. What does the school do to ensure that parents are involved in their children’s education?

4. What factors contribute to the achievement gap between ELL students and other students?

5. What plans does the school have in place to address this achievement gap?

6. What percentage of non-native students do you have in your school?

7. How do you prepare teachers to deal with the issues associated with servicing a high ELL population?

8. What is your biggest area of concern when dealing with ELL students?

9. As an administrator dealing primarily with ELLs, what is your greatest success? Biggest failure?
APPENDIX L

Focus Group Questions

You have been chosen to participate in this study because you are an English Language Learner. Participation is optional; before participating in this focus group, you must submit your signed parental consent form. Please answer each question truthfully. There is no right or wrong answer.

1. What did you do to make sure you were ready to come to school in the United States? Did you first come to the International Center? If so, how long were you there and what was it like?

2. How many years were you required to be in school in your native country?

3. Do you feel that your teacher tries to understand help you? Please give an example.

4. Do you feel that your teacher respects your culture? If so, how is it included in your class lessons?

5. Do you have any ESL classes? If so, do you like the ESL classes better than general classes? Why? What is the difference?

6. Does the size of your class make a difference in how you learn?

7. How old are your classmates? Do your older classmates who do not speak English well have a harder time learning than your younger classmates?

8. How often do you study for science class?

9. How does dealing with immigration affect your learning? How often do you miss school to meet with immigration?
# APPENDIX M

## Findings, Implications, and Recommendations Chart

<table>
<thead>
<tr>
<th>Finding</th>
<th>Implications</th>
<th>Practice</th>
<th>Policy</th>
<th>Research</th>
</tr>
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</table>
| ELLs in sheltered science classes scored higher than those in mainstream science classes | • In learning to become more academically proficient in language, it is important to provide students with the opportunity to practice and process new concepts.  
• Smaller class size allows the teacher to give more individualized attention to students. | • In schools with high populations of ELLs, require all teachers to be trained in best practices and strategies of ELLs.  
• Provide faculty and staff with ongoing professional development to aid them in working with ELLs. Sessions should include cultural sensitivity training to ensure teachers understand how to develop meaningful relationships with their students.  
• Use data to drive instruction and all decisions as it relates to ELLs in science.  
• In order to promote parental involvement, make school more accessible to ELL parents. | • School boards and local districts should provide additional human and financial resources to support professional development for teachers in ESL instructional strategies.  
• Local school leaders should develop procedures to closely monitor the student performance of ELL students and provide students with the necessary support to increase achievement.  
• In order to provide continuous improvement to ESL instruction, annual program evaluations should be conducted. | • Conduct the same student to determine how class placement affects ELL student achievement in other core subjects (math, English, and social studies).  
• Expand the study to include other schools with different student demographics  
• Compare ELL student achievement in various academic settings such as private/public schools, large/small schools, rural/urban/suburban schools, etc.  
• Interview and/or conduct parent surveys to gain further insight into the effects of parental involvement on ELL student achievement. |
| ELLs with higher ACCESS scores had higher 9-week averages than those with lower scores | • Develop standards/criteria that help to determine what science classes ELLs take and when as well as which class setting (sheltered or mainstream) is the most academically lucrative for each ELL.  
• Have an ever-changing word wall in the classroom. Each week, as new concepts are introduced, add the lesson’s new vocabulary words to the wall and discuss how they relate to the previously learned. | • Local school leaders should develop procedures to closely monitor the student performance of ELL students and provide students with the necessary support to increase achievement. |
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<thead>
<tr>
<th>Finding</th>
<th>Implications</th>
<th>Recommendations</th>
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<tr>
<td>• Allow students to use the Internet to research and explore topics. This allows them to research in their native language and translate the final product into English.</td>
<td>Practice</td>
<td>• When questioning students, be sure to give adequate wait time to ELLs. It takes them longer to process questions and come up with an answer.</td>
</tr>
<tr>
<td>• Have an ever-changing word wall in the classroom. Each week, as new concepts are introduced, add the lesson’s new vocabulary words to the wall and discuss how they relate to the previously learned</td>
<td>Policy</td>
<td>• Have an ever-changing word wall in the classroom. Each week, as new concepts are introduced, add the lesson’s new vocabulary words to the wall and discuss how they relate to the previously learned</td>
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<tr>
<td>• Speak clearly and slowly, writing down any key terms mentioned so that students can make connections between what they read and what they hear.</td>
<td>Research</td>
<td>• School boards and local districts should provide additional human and financial resources to support professional development for teachers in ESL instructional strategies.</td>
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<tr>
<td>• Use lots of visuals such as Power Points and guided notes, videos, and graphic organizers to help students visually understand how concepts fit together.</td>
<td></td>
<td>• Speak clearly and slowly, writing down any key terms mentioned so that students can make connections between what they read and what they hear.</td>
</tr>
<tr>
<td>• ESL classes should be highly structured; do the same basic routine on a daily basis. This repetition helps ELLs to focus on the content rather than worry about what will be done in class.</td>
<td></td>
<td>• Employ the use of interpersonal strategies in the classroom.</td>
</tr>
<tr>
<td>• For students with very limited ELP, pair them with students who are more proficient in English.</td>
<td></td>
<td>• For students with very limited ELP, pair them with students who are more proficient in English.</td>
</tr>
<tr>
<td>• Encourage them to speak and participate in class.</td>
<td></td>
<td>• Encourage them to speak and participate in class.</td>
</tr>
<tr>
<td>ELLs who regularly attended class had higher 9-weeks averages than those with frequent averages</td>
<td>• Students feel more of a connection to the teachers and that their voices can be heard.</td>
<td>• Students feel more of a connection to the teachers and that their voices can be heard.</td>
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<tr>
<td>The sheltered class setting levels learning making all students equal participants / contributors in class.</td>
<td>• The sheltered class setting levels learning making all students equal participants / contributors in class.</td>
<td>• The sheltered class setting levels learning making all students equal participants / contributors in class.</td>
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<td>ELLs who had a good working relationship with their teachers had higher 9-weeks averages</td>
<td>• Teachers should take the time to develop relationships with their students.</td>
<td>• Teachers should take the time to develop relationships with their students.</td>
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<td>Students are willing to work harder and perform for those that they feel have a vested interest in their future and well-being.</td>
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<td>• Students are willing to work harder and perform for those that they feel have a vested interest in their future and well-being.</td>
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APPENDIX N

Sample ACCESS Score Report

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- The ACCESS scores will determine
  - Can the student participate in the oral language of a mainstream classroom?
  - Can the student read and write English at levels similar to his or her mainstream classmates?
  - Does the student need an ESL class?
REFERENCES


Diaz-Rico, L., & Smith, J. (1994). Recruiting and retaining bilingual teachers:


