TEACHER EFFICACY OF SECONDARY SPECIAL EDUCATION SCIENCE TEACHERS

by

Celeste Bonton

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

Students with disabilities are a specific group of the student population that are guaranteed rights that allow them to receive a free and unbiased education in an environment with their non-disabled peers. The importance of this study relates to providing students with disabilities with the opportunity to receive instruction from the most efficient and prepared educators. The purpose of this study is to determine how specific factors influence special education belief systems. In particular, educators who provide science instruction in whole group or small group classrooms in a large metropolitan area in Georgia possess specific beliefs about their ability to provide meaningful instruction. Data was collected through a correlational study completed by educators through an online survey website. The SEBEST quantitative survey instrument was used on a medium sample size (approximately 120 teachers) in a large metropolitan school district. The selected statistical analysis was the Shapiro-Wilk and Mann-Whitney in order to determine if any correlation exists among preservice training and perceived self-efficacy of secondary special education teachers in the content area of science. The results of this study showed that special education teachers in the content area of science have a higher perceived self-efficacy if they have completed an alternative certification program. Other variables tested did not show any statistical significance. Further research can be centered on the analysis of actual teacher efficacy, year end teacher efficacy measurements, teacher stipends, increased recruitment, and special education teachers of multiple content areas.

Keywords: efficacy, special education, science instruction, certification
Dedication

I would like to dedicate my research efforts to my parents, Norris and Florence, who have always instilled in me the importance of hard work and responsibility. I appreciate their years of sacrifice to provide me with the opportunity to grow up in a stable, loving home and receive a quality education that prepared me for adulthood. Throughout the last five years, they have provided me with limitless encouragement and support. I would also like to thank the countless number of family members, friends, and colleagues who have provided me with encouragement and support throughout this long journey.
Acknowledgments

I would like to acknowledge my dissertation chair, Dr. Jaunine Fouché. Her knowledge and expertise in the area of science education is unmatchable. I would also like to thank my two committee members, Drs. Dorinda Grasty and Lesia Griffin for their support and guidance throughout the dissertation process. Thank you to Dr. Dolores Carr who has served as my own personal mentor and was instrumental in providing me with valuable knowledge in my doctoral journey.
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List of Abbreviations

Americans with Disabilities Act (ADA)
Emotional Behavior Disorder (EBD)
Free and Appropriate Public Education (FAPE)
Individuals with Disabilities Education (IDEA) Act
Individualized Education Program (IEP)
Least Restrictive Environment (LRE)
No Child Left Behind (NCLB) Act
National Longitudinal Transition Study-2 (NLTS-2)
Outcome Expectancy (OE)
Personal Self-Efficacy (PSE)
Regional Education Service Agencies (RESA)
Social Cognitive Theory (SCT)
Self-Efficacy Beliefs about Equitable Science Teaching (SEBEST)
Special Education Elementary Longitudinal Study (SEELS)
Special Education Needs And Disabilities (SENDS)
Science, Technology, Engineering, And Math (STEM)
Science Teaching Outcome Expectancy (STOE)
CHAPTER ONE: INTRODUCTION

Overview

The effects of the implementation of the No Child Left Behind Act (NCLB) caused many school districts to undergo a fiscal crisis (Hayes, 2015). The thought process behind this legislation was to ensure that all students regardless of disability or geographical location would be afforded the equal opportunities to receive a free and appropriate public education (FAPE) under the law (Zirkel, 2015). An indirect effect was the inability of school districts to hire and retain qualified educators who were able to provide differentiated instruction to meet the needs of all students who were learning in a common environment. What was not anticipated was the impact that funding this legislation would have on school districts that were already experiencing funding difficulties due to the low socioeconomic status of its taxpayers or other uncontrollable circumstances (Rush & Scherff, 2012). The federal legislation did require many school districts to begin to focus on both monetary and personnel resources toward student populations that had once been overlooked and neglected.

Background

Federal, state, and local governments have all concluded that significant attention needs to be placed on school environments where any portion of students receive special education services. Although this attention may take different forms, it is necessary to make education an all-inclusive environment that allows learners to receive the necessary tools in order to succeed. This must first start with skilled and effective teachers who are able to manage their classrooms efficiently (Rush & Scherff, 2012). This realization has also led many governing entities to looking at the nature in which teachers are trained, hired, and retained. In alignment with this
analysis comes the exploration of personal teacher belief systems in performing as effective and efficient educators.

This means that personal beliefs are ultimately one of the more significant driving forces of effective educators in the classroom in terms of student growth percentile and student growth success as measured by local, state, and federal measurement guidelines. Although each school district may have its own predetermined list of criteria to measure teacher performance, the ways in which teachers view themselves carries significant weight when looking at the overall success of a school or local school district. The views that teachers hold ultimately determine the environment in which learning will occur.

Data obtained from two distinct studies using the Teacher Irrational Belief Scale showed teacher occupational stress in four categories: (a) self-downing, (b) authoritarianism, (c) demands for justice, and (d) low frustration tolerance. A total of 850 study participants were categorized as providing elementary and secondary instruction in a number of Australian schools. Data showed that increased stress levels in at least two of the identified categories prompted teacher retirement (Bernard, 2016). When teachers do experience these types of stressors, it is difficult to find support and mentorship among more experienced educator colleagues (Lee, Patterson, & Vega, 2011).

The historical context in which teacher beliefs are important goes back to Bandura’s theory of self-efficacy (Rashidi & Moghadam, 2014). Particular reference is now being directed toward teacher belief systems that relate to special education instruction. The history of special education dates to less than a century ago when students with special education needs and disabilities (SENDs) were viewed as a particular subgroup that did not have the potential to learn. In fact, students with disabilities learned in an exclusionary environment regardless of
disability or the identification of the least restrictive environment (LRE) as relating to the needs of the student (Carson, 2015). Students were not given the chance to learn and excel in an academic environment with their peers. With changes in federal legislation, students are now placed in learning environments that are shared equally by all students regardless of the presence of mental, emotional, or even psychological disabilities.

From a societal standpoint, the shifts and belief systems of inclusion or mainstreaming viewpoints has come about through the passage of the Americans with Disabilities Act (ADA) and the recent revision of the Individuals with Disabilities Education Act (IDEA). The education of a student with a disability in the United States dates back to the early 20th century when students who attended school with learning challenges were often sent to mental institutions and found to be incapable of learning. The Civil Rights Movement of the 1950s and 1960s fought for the rights of all previously unprotected classes. This movement directly contributed to the later inclusion of students with disabilities into general education classrooms, a change from their exclusion of receiving an education in classrooms with their nondisabled peers (Kleinhammer, Tramill, & Brace, 2010). In the following decade, the 1970s, students were afforded protection through the Education of the Handicapped Act that provided that all students were guaranteed a FAPE in the public school setting in the LRE (Carson, 2015).

A result of the passage of this legislation resulted in the increase of teachers completing preparation programs in the field of special education. The progression of time eventually led to the improvement of the quality of teaching professionals found in classrooms where students with disabilities are learning (Kleinhammer et al., 2010). In order to provide for the appropriate training within the auspices of special education, additional allotments of federal $99 million in federal funding was allocated through the Office of Elementary and Secondary Education for the
improvement of personnel preparation. While the quantity and quality of special education professionals was considered to be a priority of that time period under the Elementary and Secondary Act, gaps in the content knowledge of teachers was present in terms of the alignment of priorities including transition planning (Kleinhammer et al., 2010).

The changes in the 1990s were indicative of two major pieces of legislation: ADA and IDEA. It should be noted that ADA is considered the first substantial legislation enacted to guarantee rights for Americans who possessed one or more physical or mental disabilities. The passage of this legislation brought the much needed attention and acknowledgement to disability rights identified under federal and state governments. The Act further strengthened the position of the Equal Employment Opportunity Commission (EEOC), which sought to eradicate unfair hiring practices of persons of disabilities (Rozalski, Katsiyannis, Collins, & Stewart, 2010).

The impact of ADA changed the manner in which opportunities were offered to Americans with disabilities. The Sutton Trilogy further fortified the country’s stance on allowing all persons of disabilities to find and maintain gainful employment. This series of landmark cases further strengthened the argument of activists who felt the government should provide people of disabilities with rights and protection under the law. The effect of this particular acknowledgement then encouraged conversations at the elementary and secondary levels of education in regard to how students were receiving their education prior to reaching the age of maturity under state jurisdictions (Cavaliere, Mulvaney, & Swerdlow, 2012).

Because legislation has now accounted for accommodations in all environments for students and persons with disabilities, it is necessary to understand how educational environments have been modified. From a societal viewpoint, the ability of school districts to retain the most effective teachers has not been met with ease. States such as Tennessee have
implemented a retention bonus program in an effort to attract and retain the most effective classroom educators in the lowest performing schools (Springer, Swain, & Rodriguez, 2016). Similarly, various school districts in the state of Georgia have begun offering bonus and stipend programs to both retain and retract special education teachers to the school district (Childre, 2014).

The amount of funding made available to diverse STEM opportunities has increased. In 2014 alone, over $52 billion dollars were allocated for academic science research in postsecondary institutions that granted doctoral degrees (Lanahan, Graddy-Reed, & Feldman, 2016). However, students with disabilities are among a specific student population who may not have the opportunity to pursue STEM degrees in a traditional postsecondary environment. Although there is a strong preference of vocational and technical programs, there is little evidence that shows strong support in the preparation of students who are able to meet or exceed the requirements for matriculation and completion of such programs (Hirvonen, 2011).

In many states, such as Georgia, students with intellectual and developmental disabilities between the ages of 18 and 21 are provided the opportunity to receive their final 3 years of public school in an alternate placement setting. Student rights guaranteed under each school district’s transition services department allows learning to occur in postsecondary settings such as colleges and universities. Students who still possess special education rights and who have not reached the age of majority (23) qualify for community-based instruction and career technical instruction. This type of opportunity is appealing to students because it includes access to adult learning experiences, participation in employment and community activities, and improving independent living and social skills (Grigal, Dwyre, Emmett, & Emmett, 2012).
Current research shows a steady decline in the number of teachers who enter and remain in the field of education due to factors such as training and experience (Aloe, Amo, & Shanahan, 2013). As a result, there has been a shift toward alternative means for preservice teachers to obtain licensure to gain full-time employment as future educators. In the particular fields of science, technology, engineering, and math, alternative teacher education programs, many are transitioning to the classroom as career changers or those who have maintained successful careers outside of the field of education but who may have advanced degrees. Alternative certification programs allow universities to offer transition-to-teaching programs that embrace past career experience through minimal coursework to obtain licensure (Koehler, Feldhaus, Fernandez, & Hundley, 2013).

Teacher licensure can occur through three different types of certification programs: (a) local licensing agency, (b) alternative certification programs, or (c) traditional university programs. The Georgia Teacher Alternative Preparation Program works in conjunction with regional education service agencies (RESAs). RESAs are 16 local licensure accrediting agencies throughout Georgia that have the authority to recommend state licensure of teacher candidates under the guidance of the Georgia Department of Education and its licensing body. Metro RESA, the local agency that will be of most importance to this study, grants licensure in eight counties and three city school districts, two private schools, and state schools in 10 metropolitan cities (Georgia Department of Education, 2016). Table 1 shows data released from the state’s teacher licensing commission. While it shows an increase in the number of teachers who are newly entering the field, rates of newly licensed special education teachers varies. A closer analysis of teacher certification through local licensing agencies (as shown in Table 2) shows
that GA RESA programs are responsible for producing a large percentage of newly hired and licensed teachers.

<table>
<thead>
<tr>
<th>Hiring Year (Fall)</th>
<th>Total New Teachers Hired</th>
<th>(1) Georgia Teachers Returning after a Break in Service</th>
<th>(2) Rookies from Georgia Programs</th>
<th>(3) GaTAPP Non-Traditional Teachers</th>
<th>(4) Other Sources *</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>6763</td>
<td>30.6%</td>
<td>49.6%</td>
<td>6.6%</td>
<td>13.2%</td>
</tr>
<tr>
<td>2011</td>
<td>6941</td>
<td>30.7%</td>
<td>48.5%</td>
<td>5.9%</td>
<td>14.9%</td>
</tr>
<tr>
<td>2012</td>
<td>8369</td>
<td>27.6%</td>
<td>40.3%</td>
<td>6.4%</td>
<td>25.7%</td>
</tr>
<tr>
<td>2013</td>
<td>8132</td>
<td>26.9%</td>
<td>38.5%</td>
<td>6.5%</td>
<td>28.1%</td>
</tr>
<tr>
<td>2014</td>
<td>10806</td>
<td>28.7%</td>
<td>27.5%</td>
<td>5.9%</td>
<td>37.9%</td>
</tr>
</tbody>
</table>

* Other Sources: For this chart, it is assumed that the remainder after accounting for Returnees, Rookies and GaTAPP teachers must be mostly teachers from other states (or countries) or imports from non-public schools. Thus 100% - 30.6% - 49.6% - 6.6% yields 13.2%.

<table>
<thead>
<tr>
<th>RESA</th>
<th>Newly Hired Teachers, New to Georgia, 2010</th>
<th>Newly Prepared in Georgia from Non-Traditional Programs 2009-2013</th>
<th>Non-Traditional Percentage Contribution of Teachers New to GA</th>
<th>Newly Prepared in Georgia, from Traditional Programs 2009-2013</th>
<th>Traditional Percentage Contribution of Teachers New to GA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Savannah River Area RESA</td>
<td>179</td>
<td>8</td>
<td>4.5%</td>
<td>91</td>
<td>50.8%</td>
</tr>
<tr>
<td>Chattahoochee-Flint RESA</td>
<td>200</td>
<td>10</td>
<td>5.0%</td>
<td>78</td>
<td>39.0%</td>
</tr>
<tr>
<td>Coastal Plains RESA</td>
<td>179</td>
<td>12</td>
<td>6.7%</td>
<td>101</td>
<td>56.4%</td>
</tr>
<tr>
<td>First District RESA</td>
<td>331</td>
<td>16</td>
<td>4.8%</td>
<td>161</td>
<td>48.6%</td>
</tr>
<tr>
<td>Griffin RESA</td>
<td>250</td>
<td>22</td>
<td>8.8%</td>
<td>103</td>
<td>41.2%</td>
</tr>
<tr>
<td>Heart of Georgia RESA</td>
<td>43</td>
<td>1</td>
<td>2.3%</td>
<td>28</td>
<td>65.1%</td>
</tr>
<tr>
<td>Metro RESA</td>
<td>1,555</td>
<td>97</td>
<td>6.2%</td>
<td>515</td>
<td>33.1%</td>
</tr>
<tr>
<td>Middle Georgia RESA</td>
<td>206</td>
<td>28</td>
<td>13.6%</td>
<td>94</td>
<td>45.6%</td>
</tr>
<tr>
<td>North Georgia RESA</td>
<td>82</td>
<td>1</td>
<td>1.2%</td>
<td>35</td>
<td>42.7%</td>
</tr>
<tr>
<td>Northeast Georgia RESA</td>
<td>208</td>
<td>9</td>
<td>4.3%</td>
<td>129</td>
<td>62.0%</td>
</tr>
<tr>
<td>Northwest Georgia RESA</td>
<td>235</td>
<td>5</td>
<td>2.1%</td>
<td>117</td>
<td>49.8%</td>
</tr>
<tr>
<td>Oconee RESA</td>
<td>56</td>
<td>9</td>
<td>16.1%</td>
<td>31</td>
<td>55.4%</td>
</tr>
<tr>
<td>Okefenokee RESA</td>
<td>43</td>
<td>3</td>
<td>7.0%</td>
<td>25</td>
<td>58.1%</td>
</tr>
<tr>
<td>Pioneer RESA</td>
<td>113</td>
<td>3</td>
<td>2.7%</td>
<td>52</td>
<td>46.0%</td>
</tr>
<tr>
<td>Southwest Georgia RESA</td>
<td>123</td>
<td>17</td>
<td>13.8%</td>
<td>46</td>
<td>37.4%</td>
</tr>
<tr>
<td>West Georgia RESA</td>
<td>160</td>
<td>12</td>
<td>7.5%</td>
<td>74</td>
<td>46.3%</td>
</tr>
</tbody>
</table>

Average for All RESAs: 48.6%


In addition, it is important to view the relationship between students who complete traditional certification programs versus those who choose an alternative route. Figure 3 contains information about students who completed certification programs through traditional certification programs in an undergraduate university education program.
In relation to special education, the Georgia Professional Standards Commission has the ability to issue licenses in a total of eight special education fields: (a) special education adapted curriculum, (b) behavior disorders, (c) deaf education, (d) special education general curriculum, (e) learning disabilities, (f) physical and health disabilities, (g) special education preschool (ages 3-5), and (h) visual impairment. It should be noted that special education licenses in the state of Georgia allow special education teachers to work in grades P-12, meaning anywhere from preschool to the age of majority (Georgia Department of Education, 2015).

**Problem Statement**

Although there have been many changes in the manner in which teachers in an overall manner have been trained, the importance of providing adequate training to preservice teachers is
especially noteworthy for special education teachers in local school districts. The problem is that little research related to special education teachers who provide instruction in science classrooms exists. The lack or ineffective manner of training has ultimately led to a higher than average burnout rate of special education teachers and consequently, higher turnover rates in this particular teaching field than any other which is currently recorded at approximately 50% within the first five years of teaching (Tyler & Brunner, 2014). A significant cause of this phenomenon relates to teacher efficacy. While preservice teachers often feel prepared while going through the preservice training process, the inability to adapt and cope with the stress of being in the field is one that has affected education in a significant manner (de Boer, Janssen, & Driel, 2016).

The overall academic rankings of American students declined in reading, mathematics, and science between 2000 and 2012 (Stein & Stein, 2016). The significance of teacher training prior to entering the classroom is one significant factor in the decline in student performance. The number of preservice training and coursework varies according to the type of certification program completed by each teacher. Local accrediting agencies often offer flexibility in the required internship hours because many teachers already serve in the capacity of a classroom teacher and are often given credit for this work experience. It is recommended that teacher candidates should spend 500–600 hours in public school classrooms prior to student teaching regardless of the type of program or content area (Stein & Stein, 2016). This cumulative total is reflective of a 4-year degree program consisting of practicum hours ranging from 50 to 300 during undergraduate studies.

Comparatively, local accrediting agencies and alternative certification programs often attract second or third career changers who enter the field with initial degrees obtained in fields other than education. The critical shortage in the areas of science and special education has
caused many school districts to meet their hiring needs through the employment of less than qualified educators. An analysis of teacher standards found in five different countries (England, Australia, Canada, New Zealand, and the United States) shows two commonalities: the need for a quality teacher training program and ongoing support in the first 5 years. Research shows that during the first years of teaching many educators identified having limited content knowledge and often relied on personal perseverance to remain in the classroom (Luft, 2015).

Ironically, it should be noted that although teacher training programs may be lacking in rigorous preparedness, educators still note a high level of self-efficacy. Approximately 96% of junior and senior students enrolled in an early childhood education program self-reported understanding science concepts well enough to teach students enrolled in a community-based Saturday science program (McLaughlin, 2015). Similarly, preservice teachers who were offered additional opportunities for professional development (individual, direct experience, and small-group work) with diverse learners reported an increase in self-efficacy (Peebles, 2014).

Educators with high self-efficacy is interesting because observation and whole class teaching is representative of the inclusive classroom setting and designated under the law as the LRE for many students.

It should also be noted that research that relies upon self-reports from educators shows there is a tendency to “overestimate or underestimate their knowledge of science, science teaching skills, ability to respond to students’ questions, or their ability to impact the learning of low-income children or girls” (Hagiwara, Maulucci, & Ramos, 2011, p. 1005). Known as the Dunning Kruger effect, over 50% of people hold above average personal belief systems when in fact they possess less skill and are ineffective. The absence of a standard of measurement causes many people to hold a self-assessment that is baseless and often exaggerated (Simons, 2013).
The unskilled and unaware often display overconfidence due to a lack of metacognitive accuracy. Specific occupations (lawyers and entrepreneurs) are often overconfident, which can lead to poor decision-making (Callendar, Franco-Watkins, & Roberts, 2016).

Traditional preservice teacher programs, specifically those that provide training to those teachers who will become licensed in the field of special education, undergo training that lasts the last 2 years of the undergraduate career. During this time, students complete courses that allow them to become familiar with the characteristics and methods for learning the specificities of learning, physical, and psychological disabilities. The students are then required to complete a teaching practicum or internship ranging in length from one to two full academic semesters; thus allowing students to put into practice what has been taught during their academic coursework (Robertson & Singleton, 2010).

In addition, special education teachers who are knowledgeable in a content area are in higher demand in various geographical areas in the United States (Robb, Smith & Monstrosse, 2012). Although each state looks at the effect of student growth in the areas of math and English, it is important to note the effects of teacher efficacy in the content area of science. Recent evaluations of future job growth areas show that in fields such as engineering and technology, there will be exponential job growth (Guzey, Harwell, & Moore, 2014). Although students who possess disabilities may experience deficits in one area such as language and comprehension, they may succeed in areas such as logic and critical thinking but need alternate methods of learning.

Minimal research is focused on training special education teachers to be effective instructors of science (Cook & Odom, 2013). A plethora of research sponsored through local and government entities exists to improve the nature of language and math instruction while
neglecting the effects of effective instruction in science content (biology, chemistry, earth/space science, and physics) that could possible lead students to have successful careers in vocational and technical fields (Grigal, 2011).

**Purpose Statement**

The purpose of this study was to investigate variables that may contribute to the rates at which secondary special education teachers in a metropolitan Georgia school district are leaving the profession. The independent variables are number of hours of preservice training, type of preservice training, classroom setting, gender, and geographic location (learning community) in the school district. The identification of geographical location of the study participant is consistent with the nature in which it is viewed in the metropolitan area. The county is considered the largest in the state of Georgia, with the northern part of the county viewed as the *golden corridor*. This name has been given to this area due to the wealth and high socioeconomic status of its residents while the southern part of the county is viewed as low socioeconomic status (Carpenter, 2004). The population of the study will only include teachers who are employed as a special education teacher and possess a valid teaching certification in any of the special education certification fields. The sample will include all teachers who are special education teachers and who provide specialized instruction in the content area of Science.

**Significance of the Study**

This study was designed to identify factors that contribute to higher teacher burnout rates or early retirement among special education teachers specifically in science content only classrooms. The results may be useful to teacher education programs across the country in an effort to modify the manner in which special education teachers receive training prior to entering and managing their own classrooms. Currently, special education teachers are not prepared to
provide science and instruction although federal law requires that special education teachers be highly qualified (Stayton, Smith, Dietrich, & Bruder, 2012). Additionally, there is a lack of substantial research centered around special education teachers as the providers of science instruction (Mulvey, 2016). Teachers receive continuing professional development and training while employed but it is important to look at what factors need to be addressed while students are still enrolled in either traditional or alternative preparation programs (Savolainen, Engelbrecht, Nel, & Malinen, 2012).

**Research Questions**

This study investigated the following research questions:

**RQ1:** Does the perceived self-efficacy of secondary special education science teachers differ by the number of preservice training hours they completed?

**RQ2:** Does the perceived self-efficacy of secondary special education science teachers differ between the types of preservice training programs the teachers completed?

**RQ3:** Does the perceived self-efficacy of secondary special education science teachers differ between the classroom settings (inclusion or resource) in which the teachers teach?

**RQ4:** Does the perceived self-efficacy of secondary special education science teachers differ between genders?

**RQ5:** Does the perceived self-efficacy of secondary special education science teachers differ by the school district’s geographic sections?

**Hypotheses**

$H_01$: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to number of preservice training hours completed.
H₀2: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to type of preservice training completed.

H₀3: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to type of classroom setting.

H₀4: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to gender.

H₀5: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to the school district’s geographic sections.

Definitions of Terms

Alternative certification programs. Alternative routes to teacher certification allow the teacher to serve in the capacity of record in the classroom, under an alternative or temporary certificate, while obtaining the necessary college coursework toward full certification (Ludlow, 2011).

Geographic location. For the purposes of this study, the identification of geographical location of the study participant is consistent with the nature in which the county (and school district) is viewed in the metropolitan area. The county is considered the largest in the state of Georgia, with the northern part of the county viewed as the golden corridor. This name has been given to this area due to the wealth and high socioeconomic status of its residents while the southern part of the county is viewed as low socioeconomic status (Carpenter, 2004).

Inclusion. Education model addressing the educational requirements of students with special needs in general education classes parallel to the social and educational cohesion with their peers (Girli, 2013).
Inclusion (team taught or cotaught) classroom setting. Students receive instruction in a setting in which no specific teaching professional is responsible for content-area instruction. (Tremblay, 2013).


Secondary science classroom. For the purposes of this study, a secondary science classroom is identified as one that provides instruction in the content areas of middle grades (6–8) science or in Grades 9–12 (high school) content areas of biology, chemistry, earth systems, physics, or physical science.

Teacher efficacy. A teacher’s personal judgement or belief about his or her capabilities to teach and is a tenet of Bandura’s social cognitive theory (Aldridge & Fraser, 2016).

Traditional university teacher program. Specifically, traditional university teacher programs provide training to teachers who will become licensed in the field of special education and undergo training that lasts the last 2 years of the undergraduate career. During this time, students complete courses that allow them to become familiar with the characteristics and methods for learning the specificities of learning, physical, and psychological disabilities. The students are then required to complete a teaching practicum or internship ranging in length from one to two full academic semesters that allows students to put into practice what has been taught during their academic coursework (Robertson & Singleton, 2010).
CHAPTER 2: LITERATURE REVIEW

Overview

The shift toward effective teaching and learning has created a need for more diverse ways of providing classroom instruction. Teacher preparation programs across the United States are continuously adapting the manner in which student teachers or preservice teachers are learning to become future efficient and effective classroom managers. Simultaneously, federal and state laws have changed the manner in which students with disabilities are receiving instruction. Although the process through which students are identified in order to receive special education services has remained the same, the rights guaranteed to this particular population of students has become more reflective of inclusivity. As a result, it is necessary to provide educators with the tools needed to build confident learners who may struggle with daily classroom learning. A review of current literature contains an emphasis on the complex nature of federal special education laws and student rights. Adequate research is available in reference to elementary and secondary special education educators.

Theoretical Framework

Bandura’s social cognitive theory (SCT) is related to the interaction between the social environment, internal stimuli, and behaviors (Swearer, Wang, Berry & Myers, 2014). The social environment is defined as the setting on which a person interacts while internal stimuli relates to the cognitive processes and feelings of a person. These two aspects of the theory ultimately affect one’s behaviors. Ultimately, SCT determines how self-efficacy is formed according to (a) enactive performance accomplishments, (b) vicarious experiences, (c) verbal persuasion, and (d) emotional and psychological states (Phan &Ngu, 2014).
A comprehensive analysis of SCT shows the affect it can have upon perceived teacher efficacy. The basis of SCT is human agency because “individuals are more likely to pursue activities for which they believe they have the capability to succeed” (Goddard & Goddard, 2001, p. 812). Likewise, if teachers’ perceived self-efficacy is high, it is likely they will engage in meaningful instruction. The rationale can be viewed as “changes in perceived efficacy result from cognitive processing of the diagnostic information that performances convey about capability rather than performances per se” (Bandura, 1997, p. 81). A correlation can be made between perceived teacher efficacy and SCT—teachers hold the perception that they are the most effective when they are able to regulate their own motivation and behavior, which ultimately produces a desired outcome (Glynn, Brickman, Armstrong, & Taasoobshirazi, 2011).

In academic settings, efficacy is comparable to the criterial task (Pajares, 1996). This means that one has the tendency to be influenced solely on the strength of efficacy beliefs. If the thought process is one that is grounded in strong efficacy, the cognitive thinking is directly proportional and would result in the belief that a task is completed according the best of one’s ability. On the contrary, if there is a low value of efficacy, one’s belief in task completion can be hindered or non-existent.

**Special Education Laws and Rights**

Current laws that govern how students with special needs learn in classrooms have experienced a metamorphic change since its early inception. The Civil Rights Movement of the 1950s and 1960s fought for the rights of all previously unprotected classes. This movement directly contributed to the later inclusion of students with disabilities into general education classrooms, a change from their exclusion of receiving an education in classrooms with their nondisabled peers. In the following decade, the 1970s, students were afforded protection under
the Education of the Handicapped Act that provided all students with a guaranteed free and appropriate education in the public school setting in the LRE setting. The passage of this legislation resulted in an increase in teachers completing preparation programs in the specific field of special education. The progression of time eventually led to the improvement of the quality of personnel qualified and trained to teach students with disabilities (Kleinhammer-Tramill et al., 2010).

Regardless of the learning environment, students are afforded the opportunity to receive any special education or related services that may be required (Sopko, 2013). The translation of this law ensures that even though parents may decide to enroll their student in a religious, parochial, or for-profit institution of learning, the same rights are made available as though the student was attending the local public school. A local education agency is required to play an active role in the IEP process in the form of guidance or technical assistance. In some states such as Massachusetts and New York, students are required to receive entitlement services through their local education agency, while in other states, such as Maine, services are provided on a case-by-case basis. This may mean that a representative from the student’s home school district serves in varying roles from the review of all IEP documents to passive participation.

The complexities that surround the interpretation of the nature of diverse disabilities along with the subsequent need for identification of what is considered to be a FAPE has caused many state and local districts to fall short in terms of meeting student needs according to federal legislation. The IDEA has undergone four revisions since its inception in 1987 with the honest intent of improving learning environments for students with disabilities. Formally known as Education for All Handicapped Children Act of 1975 and renamed IDEA, legislation has sought to improve the entire process of student learning guaranteed by an IEP. Parent participation is
encouraged in order for students and their families to feel more comfortable with the lengthy process of creating and amending this legal document that is required to be enforced under federal law. This is further encouraged through the guarantee of parental rights through the identification of various forms of dispute resolution: (a) mediation, (b) state compliant procedures, and (c) due process (Mueller, 2015).

While the enforcement of any or all of the dispute resolution process may look different according to the local educational governing body, it protects the rights of students and their legal guardian(s) in terms of legal protection. The legally recognized parent or guardian of the student is afforded the opportunity to have an impartial dispute mediator render a legally enforceable decision that takes into the account the best interest of the child along with resolving conflict among all stakeholders (Mueller, 2015). The 2004 reauthorization of IDEA guaranteed specific protections under the law and strengthened parental rights in a process that can sometimes be overwhelming or frustrating for those who may not be familiar with complex nature of the language in which the laws are written.

In addition, Section 504 of the Rehabilitation Act of 1973 gives local school districts authority to provide the reasonable implementation of accommodations without discrimination on the basis of disability. By contrast, NCLB outlined specific laws governing state standardized assessments or high-stakes testing (Blackwell, 2012). Presently, NCLB has been replaced by the Every Student Succeeds Act signed into law in 2015. Seven distinct differences can be identified through the most recent reauthorization. Components relating to assessments include the separation of test reporting, the placement of a 1% cap on students taking alternate assessments and the ability of all educators to give alternative assessments. Two components relating to the social aspects of student learning environments include strategic planning to reduce bullying and
the monitoring of excessive discipline practices. The last two unrelated components address students who may have been diagnosed with dyslexia and the protection of funding for gifted or talented students (Darrow, 2016).

In relation to the academic setting, special education law requires a distinct process for evaluating and identifying a student for special education services. The student must meet criteria according to disability classifications under IDEA. Secondly, the student must have an identified need for services according to distinct disability categories: (a) emotional disturbance, (b) intellectually disabled, or (c) possessing any other health impairment. If the student meets the required conditions for classification of any or all of the disability categories, classroom supports and accommodations are granted and protected under federal law (Zirkel, 2015).

Although the average classroom teacher may be skilled at providing the best possible instruction to students functioning at grade level, there may be extenuating circumstances where a student may need to go through a response to intervention process to identify accommodations and supports that may be needed in order for the student to be successful. If the daily instruction fails to meet the needs and style of the student, further screening and identification is necessary. As a result, students may learn through the assistance of an IEP. This may mean that an inclusive setting is necessary (Brown, 2007).

After the identification process has concluded, an IEP committee is formed to discuss how the student will learn in the school setting. This committee can be composed of a diverse group of professionals according to the student’s disability. This must always include a general education teacher, a special education teacher, and any other specialist or support personnel who will be involved with the learning and growth of the child. The committee makes the final recommendation as to the LRE in which the student will learn and the required accommodations
and supports needed for the student to progress at a level that is equivalent to nondisabled peers. At this point, a special education teacher provides small-group instruction or provides dual instruction in an inclusive setting. Federal law offers parental rights in relation to the how the educational setting is chosen and implemented.

**Inclusion and Least Restrictive Environment**

The changes in the 1990s were reflective of the ADA and IDEA. ADA is noted as the first substantial legislation enacted to guarantee rights for Americans who possessed one or more physical or mental disabilities (Rozalski et al., 2010). Federal guidelines have sought to provide a LRE for all students regardless of the diverse educational backgrounds that may exist. As this specifically relates to students with disabilities, there is a guarantee of a FAPE explicitly expressed through federal and state legislature.

Inclusive education in the public school setting refers to providing instruction to all students in regular classrooms within mainstream schools with only “temporary withdrawal from this situation for purposes such as individual or group work or therapy” (Hornby, 2015, p. 235). This means that within the average school day, SENDs receive anywhere from zero to the majority (75%) of all classroom instruction with nondisabled peers. The exception is the removal of the child to obtain specialized services such as speech or occupational therapy or for individualized instruction outside of the group setting. The theory of inclusive special education is reflective of guidelines and practices that are consistent with federal and state mandated policies to ensure that the manner of instruction that is provided to SENDs is consistent with the nature of the student’s disability (Hornby, 2015).

The ultimate decision maker in terms of classroom placement lies with school principals in the student’s local school. On many occasions, the geographical location of the school or
school district determines the manner in which inclusion is implemented. Rural school districts present a unique set of challenges in relation to educating students with disabilities. The lack of qualified and experienced teachers in rural settings is prevalent. A lower funding base coupled with a lack of access to necessary professional development and training of special education teachers influences the quality of student education. Current research reports that only 8,581 teacher candidates graduated from special education certification programs with very few choosing to teach in rural areas (Hoppey, 2016).

Although federal regulations dictate the learning environment of students with special needs, implementation lies with the personal belief systems of the local school administration. Two driving factors seem to affect classroom placement decisions directly—efficacy and systemic factors. Research shows that if principals have a low belief in their ability to change the learning environment, they are more likely to interpret policy implementation in an inconsistent manner. In addition, time constraints and the size of the school determine if principals are able to become responsible decision makers. Principals cited daily challenges and a push toward specific limiting factors that influence their decision making. Although special education law is complex and detailed in nature, many reported receiving minimal to no training in the complexities of IDEA (Sumbera, Pazey, & Lashley, 2014).

Thoughts and belief systems can often be influenced by the political climate of the local community and often negatively affect how restrictive the environment may be. Research shows that when school principals are interviewed, their belief system shows no evidence that consideration was given to the placement of students in the general education classroom setting with nondisabled peers (O’Laughlin & Lindle, 2015). The results of this particular study show a trend to place students initially in the most restrictive setting rather than the least restrictive.
Indirect results of this decision can have the ability to affect students for years beyond the grade level in which this error occurs.

Two opposing viewpoints have been identified in terms of what is meant by inclusion and least restrictive. Supporters of the inclusion model state that education must always occur in the general education setting. This viewpoint is supported by the belief that even though a student may possess a disability, it is always considered advantageous to receive instruction and services with nondisabled peers. It is suggested that the general education setting provides the necessary equivalent learning opportunities for students in order for them to be successful. By contrast, there are those who state that supports and accommodations for students with disabilities must occur where the needs can be met (Marx et al., 2014).

Comparably, in Korea, approximately 85,000 students are identified as having special needs, with almost 71% of those students receiving instruction in the inclusion setting. If this is viewed in terms of the historical context of Korean special education, the passage of the 1977 Act on the Promotion of Education for the Handicapped is new in providing equal opportunities for learning for all students. However, the definition of inclusion in this case describes a learning environment where students are assigned to special classrooms in regular schools who receive nearly all of their instruction with other students who have disabilities (Kim, 2013). Essentially, the meaning of inclusion is similar to a small-group resource setting in which students are learning.

The inclusion with co-teaching and solo-taught instructional models in learning environments has changed in the last two decades. The co-teaching model refers to two teaching professionals providing instruction to students in one classroom setting. The general education and special education teachers may use many ways to introduce new content to students. This
may include support teaching, parallel teaching, station teaching, alternative teaching, or team teaching. This collaborative setting has changed in order to include the input and expertise of the special education teacher who is trained in teaching strategies known to be effective with students who may be the most challenging in an academic or behavior context (Tremblay, 2013).

Also known as the pull-in method, students receive instruction in a setting in which no specific teaching professional is responsible for content-area instruction. The benefits of this environment include a smaller student to teacher ratio, the opportunity for two diverse methods of presenting instruction, and heterogeneous grouping (Tremblay, 2013). It is common for pull-in environments to group students according to factors other than ability level. Students can be grouped according to gender, personality traits, or other factors.

By contrast, the solo-taught class setting (also known as pull-out or resource) is used to provide the necessary targeted instruction to those students who need more focused academic instruction. There is no evidence that shows that there is a positive impact on standardized test scores (Tremblay, 2013). Although students may be receiving instruction appropriate for their instructional needs, pull-out or resource models do not translate to higher test performance or a greater increase in self-esteem. In the content areas of reading and math, students who receive instruction in inclusive classrooms perform better and have higher levels of self-esteem compared to those in the pull-in environments (Tremblay, 2013).

In Turkey where the theory of inclusion has only been widely accepted since 2010, students with disabilities are guaranteed 11 specific rights by the Ministry of National Education. Its aim to “help disabled students gain psychosocial and academic skills “has been accepted as a broad education reform that supports the diversity of all student learners (Sakiz & Woods, 2014, p 136). One of the most significant factors leading to this specific type of education reform
relates to the increase in students with special needs from 20,000 to 161,295 in a 13-year period. Sakiz and Woods (2014) found that classroom teachers and counselors in the Turkish cities of Istanbul and Mardin held positive attitudes about inclusive classroom settings.

**Related Literature**

**Types of Training Programs**

The Special Education Elementary Longitudinal Study (SEELS) and the National Longitudinal Transition Study-2 (NLTS-2) are two longitudinal studies that have been funded by the U.S. Department of Education to collect data in reference to how special education students receive required classroom accommodations in the general education setting. The research currently available from the NLTS-2 and SEELS studies present valuable data in the analysis of the student population and the special education services they receive on a daily basis in schools throughout the United States. The summary of the data obtained from these studies has been essential in the ways in which local, state, and federal governments have allocated funds to educate students with disabilities in a manner equal to their nondisabled peers. These studies included the use of multiwave data collection in order to maintain a continuous process of documentation of students’ special education services. Also known as tracking, this can be used to determine if modification to transition services are needed once the student reaches the age of majority which may vary of age 14 to 17 (Grigal, Hart, & Migliore, 2011).

The NLTS-2 is a database with the quantitative breakdowns of the types of disabilities students possess according to grade level. This multiyear study involved 11,000 students between the ages of 13 and 18 who were receiving special education services between 2000 and 2009. This massive study analyzed 10,000 variables about students and their households, school experiences, extracurricular activities, postsecondary experiences, and transition outcomes in the
domains of education, employment, and leisure time. The parents or legal guardians who chose to participate in this lengthy study were surveyed 10 times (five times every 2 years) while youth were surveyed for four times every 2 years (Grigal et al., 2011). A synopsis of the data shows the effect of special education services on postsecondary outcomes based on rates of college and university enrollment and the success rates at which students were able to obtain and maintain full-time employment. A secondary analysis of the NLTS-2 involving 2,470 postsecondary students showed that secondary schools can influence the likelihood that students will be knowledgeable enough to seek out accommodations and supports needed after leaving high school (Newman & Madaus, 2015).

Staff and teachers employed by participating school districts were also surveyed two times during the first half of the study (Grigal et al., 2011). As it relates to training and development focused on transition planning, the results of a multistate survey show that an average of 28 hours was spent in acquiring content while 14% of teacher respondents reported not having any prior training prior to entering the classroom (Morningstar & Benitez, 2013).

An analysis of state teacher certification programs shows that both special education and middle grades science are both in the top 10 areas of teacher certification according to table 4. However, according to the data collected by Georgia’s licensing commission, there were no data showing teachers who were dually certified in both special education and science. Approximately 4,700 new teachers entered the teaching profession in Georgia during fiscal year 2013. However, only 725 or 15% of new teachers became special education teachers in either general curriculum or early childhood education (See Figure 2).
Figure 4. Georgia universities with approved education programs in special education general curriculum and the number of coursework and field hours completed by students prior to receiving the Bachelor’s of Education in Special Education General Curriculum. Adapted from the Georgia Professional Standards Commission (GA PSC) website and adapted from prospective university program provider websites.

<table>
<thead>
<tr>
<th>Teaching Field</th>
<th>Traditionally Prepared</th>
<th>Alternatively Prepared</th>
<th>Total Prepared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Childhood Education</td>
<td>1971</td>
<td>38</td>
<td>2008</td>
</tr>
<tr>
<td>Special Education, General Curriculum</td>
<td>373</td>
<td>98</td>
<td>471</td>
</tr>
<tr>
<td>Middle Grades Math</td>
<td>371</td>
<td>16</td>
<td>387</td>
</tr>
<tr>
<td>Special Education with Early Childhood Education</td>
<td>352</td>
<td>9</td>
<td>361</td>
</tr>
<tr>
<td>Middle Grades Social Science</td>
<td>341</td>
<td>11</td>
<td>352</td>
</tr>
<tr>
<td>Middle Grades Language Arts</td>
<td>332</td>
<td>7</td>
<td>339</td>
</tr>
<tr>
<td>Middle Grades Science</td>
<td>311</td>
<td>29</td>
<td>340</td>
</tr>
<tr>
<td>Secondary History</td>
<td>233</td>
<td>10</td>
<td>243</td>
</tr>
<tr>
<td>Secondary Mathematics</td>
<td>193</td>
<td>49</td>
<td>242</td>
</tr>
<tr>
<td>Secondary English</td>
<td>212</td>
<td>16</td>
<td>228</td>
</tr>
</tbody>
</table>

Figure 5. Breakdown of the most common certification fields in Georgia in the 2013 calendar year. Adapted from “The 2015 Georgia public P–12 teacher workforce: A status report,” by K.
In order to view the need for highly trained and effective special education teachers, it is necessary to understand the vast groups of students with varying forms of disabilities. The SEELS provided important data about the education of students with disabilities. By comparison, the limitation of SEELS lies in its sole analysis of elementary students and the academic challenges that may be faced by these individuals. The importance of this dataset can be used to anticipate services that elementary students may need when transitioning into the secondary classroom environments. Data collected in relation to disabilities possessed by students included those with emotional/behavioral disorders, learning disabilities, and attention deficit-hyperactivity disorder (Bowman-Perrot et al., 2013).

The combination of these two databases shows that students with disabilities do make an overall impact on the learning environment of the school. Students who learn through services provided through IEPs are a subset of the student population who are allowed by law to receive accommodations and supports in their individual learning environments (Kleinhammer-Tramill et al., 2010).

In order to provide the proper special education teacher training, additional allotments of federal funding in the amount of $99 million were allocated through the Office of Elementary and Secondary Education for the improvement of the teaching preparation programs. While the quantity and quality of special education professionals was considered a priority at that time under the Elementary and Secondary Action, gaps in the content knowledge of teachers in inclusive classrooms seems to have been overlooked (Kleinhammer-Tramill et al., 2010).
The effectiveness of the secondary education received by the student directly impacts the transition from the school to college setting. Once the student is near or reaches the age of majority (which may vary from age 16 to 17), the IEP team composed of those stakeholders responsible for the wellbeing for the child convene to determine the path that the student will take once leaving high school. Commonly known as a transition plan, decisions are made in regard small facts of living such as daily living skills to the more significant components of living independently on a college campus that may be located many miles from home.

Although current laws do provide for a transition process that includes transition planning in all aspects of life after high school, the quality of education that the student receives is a direct component of how the student performs in a postsecondary college or university. Students who possess a disability such as high-functioning autism spectrum disorder are one subset of students with special needs who are able to live and thrive when the proper planning and supports have been put into place. *The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)* identifies students with Asperger’s Syndrome as a Level 1 autism spectrum disorder and may express deficits in the areas of communication, behavior, and social skills. However, research shows that there is an increase in the enrollment of students in higher education. Similarly, the need for inclusion remains paramount through the early years of schooling such as kindergarten through the postsecondary years (Dipeolu, Storlie & Johnson. 2015).

**Disability and Multicultural Theories**

In order to understand the nature of student learning in reference to special education, it is necessary to take into account the disability theory as relating to student learning (Creswell, 2013, p. 23). The impact of learning with a disability whether it is physical, emotional, or cognitive requires that research adequately addresses the ways in which students must learn in
academic and social environments. The significance of the disability interpretive lens is one in which there is a “focus on disability as a dimension of human difference and not as a defect” (Creswell, 2013, p. 33). The basis of disability theory as it applies to research takes into account the impact of society upon human differences that are classified as disabilities. The significance of societal influence therefore determines how research is conducted, interpreted, and used as a method for effecting change in school inclusion laws and practices.

The premise of special education law seeks to allow the student to be inclusive in learning rather than extracted from traditional learning environments. The historical context of special education is one that viewed students with special needs as incapable of learning. However, social scientists consider disability as a small component of the multicultural theory. Just a minority groups experience social injustices and issues, students with disabilities are considered to experience similar experiences. Supporters of multiculturalism suggest that students with disabilities can be considered cultural minority or oppressed group (Anastasiou, Kauffman, & Michail, 2016). Three components include “interaction between disability and ethnic difference, the dangers of labeling, and the disproportionality issue in special education” (Anastasious et al., 2016, p. 6).

**Teacher Efficacy**

Although perceived self-efficacy differs from actual self-efficacy, it is important to examine the basis of self-efficacy also credited to Bandura. In order to understand self-efficacy, the psychology of this multidimensional concept must be analyzed. The idea of self-efficacy is one that is credited and has been identified almost four decades ago in 1977 by Albert Bandura. This theory relates to the importance of human motivation and performance in addition to “one’s ability to exercise some measure of control in the face of taxing stressors” (Benight & Bandura,
2004, p. 1129). The definition of self-efficacy is viewed as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (de Boer et al., 2016, p. 306).

Self-efficacy as it relates to outcome expectations can be influenced by goals, behaviors, and sociocultural factors. When this concept relates to teachers, the perceived efficacy affects the behavior of the teacher in the social environment upon which learning is occurring. When specifically analyzing perceived teacher efficacy, it is important to analyze the factors that determine the belief systems that govern teacher attitudes. Current research shows that preservice teacher preparation and preparedness allows the acquisition of content knowledge before entering the classroom. This aspect of preparation along with developing a functioning skillset significantly impacts if educators feel they are successful and in this case has only been measured to fall somewhere between 20% to 40% of educators currently providing instruction in the classroom (Dunst & Bruder, 2014).

Although current trends show that approximately 30% of all teachers are likely to leave the classroom within the first 3 years, this number is even greater for special education teachers. First-year educators who enter special education are two and half times more likely to leave education than those in other content areas. These outstanding rates are reflective of the amount of the preparation that preservice special education teachers receive while completing internships. This lack of preparation is expressed through teacher burnout rates in the field of special education because the work demands are more challenging than other content areas. Educators in the special education field often cite (a) extra paperwork, (b) record keeping, (c) IEP implementation, (d) behavior management skills, and (e) varying content knowledge as factors that allow to the exit or transition to general education (Lee et al., 2011). In addition,
educators in the field of education are less likely to have colleagues who are available and knowledgeable enough to provide support and mentorship (Lee et al., 2011). Comparably, statistics issued by the Georgia licensing commission shows that after three years approximately 23% of special education teachers leave the field. The impact of this constant turnover has negatively impacted efficient and effective instruction. Initiatives at the regional and local level have implemented initiatives to increase teacher retention (Childre, 2014).

<table>
<thead>
<tr>
<th>Teaching Subgroup</th>
<th>Hired in 2012</th>
<th>Left After 1 Year</th>
<th>Left After 2 Years</th>
<th>Left After 3 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>892</td>
<td>76</td>
<td>132</td>
<td>178</td>
</tr>
<tr>
<td>Elementary</td>
<td>2281</td>
<td>257</td>
<td>432</td>
<td>580</td>
</tr>
<tr>
<td>Middle School</td>
<td>1417</td>
<td>190</td>
<td>322</td>
<td>385</td>
</tr>
<tr>
<td>High School</td>
<td>2074</td>
<td>328</td>
<td>525</td>
<td>687</td>
</tr>
<tr>
<td>Special Education</td>
<td>1420</td>
<td>152</td>
<td>279</td>
<td>329</td>
</tr>
<tr>
<td>ESOL</td>
<td>103</td>
<td>15</td>
<td>26</td>
<td>32</td>
</tr>
</tbody>
</table>

*Attrition counts include only those teachers no longer in the workforce in any certified role.*


States such as California have resorted to alternative means to decrease the teacher shortage that currently exists. In a 4-year academic period, special education interns increased from 5,232 to 10,553 as documented in the public school system. The premise of the research conducted was to determine what negative factors affected student interns and ultimately how these factors contribute to a decreased level of efficacy. Data obtained and analyzed from a Likert-scale questionnaire showed that higher self-efficacy scores were influenced by school district and mentor support. In contrast, interns viewed lack of parental support and appropriate class size as negative factors.

Special education teachers who provide specialized instruction to students with disabilities are in high demand by many school districts across not only the United States but
around the world. Although the law requires students be taught by highly qualified teachers, a growing body of literature addresses the disproportionate placement of highly qualified special education teachers. Fall and Billingsley (2008) found that teachers in high-poverty schools were more likely to have fewer credentials and less preparation than those in more affluent schools. In addition, administrators in high-poverty districts reported higher teacher turnover, fewer tenured teachers, and more vacancies than those in wealthier districts (Steinbrecher, McKeown, & Walther-Thomas, 2013).

Acknowledging the shortage of highly qualified special education teachers requires the analysis of the efficacy of this particular group of educators. The basis of teacher efficacy is drawn heavily from Bandura’s social cognitive theory in which four sources of information are predicted to contribute to the development of teacher efficacy: (a) mastery experiences, (b) vicarious experiences, (c) social persuasion, and (d) physical and emotional arousal. Studies have investigated how teaching efficacy is shaped by a variety of factors. Among these are teacher preparation, specialized certification, and professional development have been shown to correlate positively with teacher efficacy (Chu & Garcia, 2014).

It must also be stated that teacher efficacy differs when viewed specifically in inclusive classrooms. Current research shows that there is negative correlation between teacher efficacy and teaching students with special needs ($r = -.22$). Factors cited for these differences include the varying teacher role model—general education teachers are charged with the task of developing students who are being prepared for the job market while special education teachers are mainly responsible for encouraging student diversity, support, and team collaboration. As a result, special education teachers report higher self-efficacy values because they were more aware of inclusive pedagogic strategies (Gebhardt, Schwab, Krammer, & Gegenfurtner, 2015).
Global studies have sought to examine how varying school systems around the
worldview efficacy in inclusive teaching settings. The European Agency for Development in
Special Needs Education reported that inclusive teamwork is dependent upon three factors: (a)
teaching practices in the classroom, (b) meeting the educational needs of individual pupils, and
(c) factors at the school level (Cor, Soriano, & Watkins 2007). Gebhardt et al. (2015) conducted
a study consisting of 321 teachers who provided both general education and special education
instruction analyzed data obtained from multi-item questionnaires. The results show that while
special education teachers are more knowledgeable in providing more diverse and inclusive
pedagogical practices but scored the opportunities for teamwork at a lower level (Gebhardt et al.,
2015).

Efficacy in the content area of science directly relates to the experiences shared by newly
qualified science teachers as well as veteran teachers. Research carried out by New Zealand’s
Teaching and Learning Research Initiative surveyed all students who graduated in the field of
secondary education within one calendar year. Data collection took place every 6 months while
newly qualified science teachers were providing instructing in their own elementary and
secondary classrooms. Analyses of the quantitative findings were consistent with pre-established

A study conducted in Scotland that included a sample of 199 mainstream general class
primacy schoolteachers sought to determine exactly how general education teachers feel about
teaching students with learning difficulties. According to the two school districts in which the
research took place, learning difficulties were cited as intellectual or learning disabilities. This
was also inclusive of children with physical and sensory disabilities that could be considered to
be anywhere from mild to severe (Woolfson & Brady, 2009). The findings from this study
suggest that even though the majority of educators (70%) reported experience with teaching students with learning difficulties, they did not feel successful or had mastery experiences involving students with learning difficulties. In addition, strong feelings of sympathy for students with learning disabilities was seen in a negative manner because it influenced educators’ views of successful learning as an external outcome that students could not control (Woolfson & Brady, 2009).

Global research conducted in South Africa and Finland represents similar beliefs in efficacy related to inclusive education. Inclusive special education in South Africa is new and has only been in existence since the formation of a democratic government in 1994. Only in the last 15 years has the term students with special needs been changed to learners experiencing barriers to learning. Finland, however, has increased equal opportunities for all students regardless of disabilities since the 1970s and special education teachers are highly valued in terms of diversity and financial support (Savolainen et al., 2012).

A cross-cultural data analysis showed that while teachers in both geographical locations view students with disabilities in a positive manner, they expressed concerns about educating the students in their classrooms. South African teachers cited high self-efficacy in relation to managing negative student behavior while Finnish teachers cited this area as a concern. The correlation between attitudes and self-efficacy showed that both belief systems are neutral, according to the Teacher Efficacy Scale used by researchers (Savolainen et al., 2012).

Further research conducted in Beijing, China shows that inservice teachers share similar belief systems. Efficacy in inclusive instruction, collaboration, and managing behavior were analyzed in order to gain valuable insight of Chinese belief systems. Recognition of inclusive education is also new, like South Africa, in that its inception is noted as the result of a 1994
United Nations Educational, Scientific, and Cultural Organization conference. Presently, the Chinese learning system is viewed as a more extensive learning support system similar to the alignment of the Finnish educational system (Savolainen et al., 2012).

Savolainen et al. (2012) found that Beijing teachers’ attitudes influenced efficacy in relation to collaboration but not toward instruction and in managing behavior. In addition, the level of experience of the special education educator had only a small but significant effect on attitudes toward inclusive education. While common themes can be identified among countries and in specific instructional level of educators, further research is needed to determine subsets of teacher efficacy in terms of specific content areas (Savolainen et al., 2012).

An analysis of teacher efficacy at the secondary level shows the relationship of age, gender, qualifications, and teaching experience may have on educator belief systems. Shazadi, Khatoon, Aziz, and Hassan (2011) found a significant difference in relation to gender. Female teachers scored higher on self-efficacy scales due to an increased level of comfort when providing classroom instruction. It is also suggested that female teachers might seem to be more secure in the field of education because it is reflective of a female-dominated field. Other noted differences included the setting upon which educators are providing instruction. Educators who provided instruction in urban areas in comparison to those who lived in rural areas also scored higher. In terms of qualification, those educators who possessed higher academic and professional qualifications felt more confident in their belief to provide valuable instruction to students (Shazadi et al., 2011).

Current debate exists, however, in the proper manner in which efficacy can be measured. The Rand measure seeks to identify efficacy in terms of what the educator is able to control within the learning environment (external) and the belief that reinforcement of teaching lies
solely within the educator (internal). In contrast, the Webb scale uses a forced-choice format that uses social desirability; educators were required to choose from an answer set. The Gibson and Dembo Teacher Efficacy Scale differ from both the Rand and Webb scales because it uses Bandura’s social cognitive theory as a basis of outcome expectancy (Tschannen-Moran & Hoy, 2001).

**Impact of Science Instruction on Students with Disabilities**

The United States Department of Labor predicts an increase in job growth in STEM fields (Villanueva, Taylor, Therrien, & Hand, 2012). The table listed below shows projected job openings through 2022 in STEM fields. Although students with disabilities were not always given the opportunity to learn, this thought process has changed allowing students to explore new career options. The varying degrees of careers available in the job market also require varying degrees of education and experience. Therefore, it is likely that many capable students will seek careers in this specific area. The beginning of a successful career begins when the student is first taught how to perform an experiment in a science lab.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Job openings, projected 2012–22</th>
<th>Employment 2012</th>
<th>Employment Projected 2022</th>
<th>Median annual wage, May 2013</th>
<th>Typical entry-level education¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software developers, applications</td>
<td>218,500</td>
<td>613,000</td>
<td>752,900</td>
<td>$92,660</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Computer systems analysts</td>
<td>209,600</td>
<td>520,600</td>
<td>648,400</td>
<td>81,190</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Computer user support specialists²</td>
<td>196,900</td>
<td>547,700</td>
<td>658,500</td>
<td>46,620</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Software developers, systems software</td>
<td>134,700</td>
<td>405,000</td>
<td>487,800</td>
<td>101,410</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Civil engineers</td>
<td>120,100</td>
<td>272,900</td>
<td>326,600</td>
<td>80,770</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Computer programmers</td>
<td>118,100</td>
<td>343,700</td>
<td>372,100</td>
<td>76,140</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Sales representatives, wholesale and manufacturing, technical and scientific products²</td>
<td>111,800</td>
<td>382,300</td>
<td>419,500</td>
<td>74,520</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Network and computer systems administrators</td>
<td>100,500</td>
<td>366,400</td>
<td>409,400</td>
<td>74,000</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Mechanical engineers</td>
<td>99,700</td>
<td>258,100</td>
<td>269,700</td>
<td>82,100</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Computer and information systems managers²</td>
<td>97,100</td>
<td>332,700</td>
<td>383,600</td>
<td>123,950</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Industrial engineers</td>
<td>75,400</td>
<td>223,300</td>
<td>233,400</td>
<td>80,300</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Architectural and engineering managers²</td>
<td>60,600</td>
<td>193,800</td>
<td>206,900</td>
<td>128,170</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Web developers</td>
<td>50,700</td>
<td>141,400</td>
<td>169,900</td>
<td>63,160</td>
<td>Associate’s degree</td>
</tr>
<tr>
<td>Electrical engineers</td>
<td>44,100</td>
<td>166,100</td>
<td>174,000</td>
<td>89,180</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Computer network architects²</td>
<td>43,500</td>
<td>143,400</td>
<td>164,300</td>
<td>95,380</td>
<td>Bachelor’s degree</td>
</tr>
</tbody>
</table>

¹ Bachelor’s degree
² Associate’s degree
³ Some college, no degree
There is a current lack of research in relation to instruction centered solely on the nature of science targeted toward students with disabilities. Also known as inquiry instruction, research shows a mean effect size of .78 on student science achievement when inquiry-based approaches are used. It has also been shown to support engagement and confidence. While direct instruction is a common method of presenting content, in the science classroom, it is suggested that learning environments implement a learner-centered approach. Research, however, shows that special education teacher training is focused on the aspects of successful remedial learning and not on flexible teaching approaches (Mulvey, Chiu, Ghosh, & Bell, 2016).

The importance of science has been recognized according by initiative such as Twenty First Century Science in the United Kingdom and the American Association for the Advancement of Science in the United States. Current emphasis is placed on the skillset required to engage actively in science content such as strong communication and social skills, information, media, and technology skills. Students with disabilities are required to receive instruction in the content area of science, as are their nondisabled peers. However, current research shows that students with disabilities score lower than their nondisabled peers. The realization of this fact requires the analysis of factors that contribute to low performance. The two most identifiable causes include teacher readiness and linguistic understanding of the student (Villanueva et al., 2012).

The teaching professional’s ability to present science content in a well-prepared manner is often lacking or undeveloped. Many content area teachers who provide instruction in the small-group resource setting are often skilled in the area of remedial training but have received
little to no professional development in the content area of science. Second, the nature in which science textbooks are written often prevents the student from understanding and mastering new content. The umbrella of disabilities as identified by IDEA includes specific learning disability. For many students who struggle with language acquisition and comprehension, reading for understanding is extremely difficult (Villanueva et al., 2012). Because science instruction usually includes a textbook or written information that includes Greek and Latin roots, it is difficult for students to both read and understand when their instructional level may not align with grade level expectations.

Regardless of whether students are being prepared for the workforce, postsecondary education, or vocational rehabilitation opportunities, it is important to view the importance of quality science instruction regardless of the students’ socioeconomic status or presence of special needs and disabilities. In relation to students who have disabilities, it is even more important that the science inclusive classroom is conducive to a positive learning environment. Research completed in terms of science instruction provided in the special education classroom includes three components: collaboration, interactions in small groups, and lastly, discourse in teacher communities. The framework of teacher efficacy formation suggests that students who are taught by high-efficacy teachers in elementary school have the tendency to become high-performing students in middle school if they are also receiving instruction by a high-efficacy teacher (Tschannen, Moran, Hoy, & Hoy, 1998). Their performance lowers when low-efficacy teachers are providing the instruction; thus proving a direct correlation of efficacy to student achievement and performance (Yoon, Evans, & Strobel, 2014).

The co-planning process is viewed in terms of the effective formation and sustainment of collaborative relationships between general education and special education teachers. Swanson
and Bianchini (2014) analyzed multiple types of quantitative and qualitative data to investigate the intricacies of teacher co-planning. It was noted that sharing personal resources, valuing the collaborating process, turn taking, and small-group roles composed the majority of time spent during a summer institute. One drawback included the lack of conversation of special education topics that may arise in inclusive classroom settings (Swanson & Bianchini, 2014).

Behavior strategies used by special education teachers have the capacity to increase science content learning of all students regardless of disability. The spectrum of teaching styles uses alternative teaching styles based upon the intending learning objective (motor, cognitive, or social). Although this concept of implementing instruction may seem to contradict special education, which requires an individualized manner of learning, it is successful in a content area such as science because it requires that students use cognitive processing in terms of logic and critical thinking rather than a teacher-centered approach. While students may be learning facts or interpreting science concepts, the goal is to have the student arrive at a conclusion or premise based upon personal logic rather than teacher-only influence (Byra, Sanchez, & Wallhead, 2014).

As the accountability of teachers increases, it is important to analyze formative instructional practices in the learning environments of students served through special education. While formative instructional practices in a science classroom can include both formal and informal ways to assess students, the nature in which this occurs for students with special needs is governed according to IDEA. The nature of an IEP identifies goals and objectives in the areas of weakness for each student served through education. Therefore, instructional practices in relation to special education align with the use of effective progress monitoring and correct interpretation of data collected in order for assessments to be considered effective tools (Graham-Day, Fishley, Konrad, Peters, & Ressa, 2014).
Multimodal Instructional Practices in Inclusive Classrooms

In order to understand the inclusive environment, it is important to note what many school districts characterize as an inclusive culture. Within such schools, there is some “degree of consensus amongst adults around values of respect for difference and a commitment to offering all pupils access to learning opportunities” (Ainscow & Sandhill, 2010, p. 405). This translates to providing quality instruction to all students regardless of past or present disabilities. In this environment, diverse co-teaching models are considered those in which both general and special education teachers provide instruction and meet the learning needs of all students. Current teacher attitudes toward mainstreaming or inclusion are reflective of initial teacher reaction of any new policy: resistance (Avramidis & Norwich, 2002). The manifestation of these attitudes has been show to affect directly the manner in which educators feel they can be effective in inclusive classroom settings.

In inclusive classrooms, the delivery of instruction involves the use of diverse ways to present content to students with special educational needs and disabilities. The instruction in this particular type of classroom must take into consideration the etiology and necessary intervention models needs to influence SENDs (Hornby, 2015). One such approach includes technology integration that is used in an effective and efficient manner (Eriști, Kurt, & Dindar, 2012). Also known as multimodal practices, elementary and secondary teachers who have the capability and access to emerging technologies experience an increased level of engagement and motivation for students who may have once struggled with learning by traditional methods (Yi & Choi, 2015).

Secondary classroom settings offer a unique group of challenges. At the middle school level, the classrooms become more differentiated in both the content and elective classes. Students are offered more choices in terms of content classes and are often based on skill and
participation level. Elective classes are often selected by the student based on areas of interest. Considering this, student needs are often beginning to change. For many students, areas of weakness are now areas of strength due to targeted and individualized instruction. Instructional accommodations are now considered based on the future progression and often times, at the high school level, the career path that the student is considering. Instructional accommodations are those supports put into place that allow students to meet specific goals and objectives as identified by the IEP. These supports can be identified to meet physical, emotional, or cognitive areas of weakness and are agreed upon by the student’s IEP team (Scanlon & Baker, 2012).

The need for knowledgeable and effective teachers significantly increases in environments where culturally and linguistically diverse students are learning (Kea, Trent, & Davis, 2002). Multicultural knowledge is especially important when determining diverse and inclusive ways to educate students who may be learning English as a second language while simultaneously experiencing learning challenges due to an emotional, psychological, or emotional disability. The presence of comorbidities in learning environments presents dual challenges that can often affect the positive learning experience of a student who is in an inclusive special education environment (Chu & Garcia, 2014).

The demographics of the United States population are changing in relation to native English speakers. There is an estimated 57% increase in limited English speakers in the last 10 years (Nguyen, 2012). The population of English language learners has increased by 50% and it is estimated that approximately 400,000 English language learners also possess a disability that requires special education services (Nguyen, 2012). A second language learning disability describes an impairment that negatively affects the manner in which students are able to learn the English language as a native speaker (Nguyen, 2012).
The impact of instruction in a science classroom can be viewed in terms of specific disabilities that fall under IDEA. Due to the nature of a physical or cognitive impairment, it may be necessary that students receive instruction in a room that is free of distractions. However, three unique categories that necessitate further analysis include emotional and behavioral disorders (EBD), moderate intellectual disability, and those students considered to possess a learning disability. Students with EBD may have symptoms that affect both academic and non-academic performance. These symptoms include slower academic progress, lower course grades, and an increase in discipline referrals in comparison to other students with special needs. As a result, the traditional methods of instruction for EBD students have not been identified as the most successful method for presenting new content. While the common method of presenting science content might be a lecture format, research shows that hands-on approaches to learning might be more effective. Due to the nature of the disability, a student with EBD experiences greater difficulty in scaffolding content. The inability to connect past knowledge to new and current knowledge can negatively impact academic performance unless diverse instructional strategies are used (Villanueva et al., 2012).

Similarly, students who possess a moderate intellectual disability are those who possess an IQ of 55 or below. They are, however, able to become activate participants in learning if the presentation of instruction is diverse. In relation to this specific group of students, time delay through embedded instruction has been proven effective. The nature of this specific disability requires that students use varied strategies such as embedded trials to remember vocabulary terms and concept statements whether it is in the general education or resource setting (Jimenez, Browder, Spooner, & DiBiase, 2012).
Students with a learning disability are typically diagnosed in the content area of science. However, experiencing a difficulty in language comprehension or written expression will most certainly affect all content areas. Students with a learning disability might have trouble in fluency, decoding, and word recognition. In addition, the ability to monitor comprehension during reading becomes troublesome. In order for students to experience success in the science classroom, it is possible to use both traditional and nontraditional methods. Results of a meta-analysis show that the demanding nature of the expository pose used in a science classroom presents difficulties for students and may require the use of diverse instructional strategies (Kaldenberg, Watt, & Therrien, 2015).

Summary

Unique themes surrounding the education of students with disabilities can be identified as special education laws and rights, inclusion (least restrictive environment), disability theory included as multicultural theory, teacher efficacy, the impact of science instruction on students with disabilities, and lastly, the use of multimodal instructional practices in inclusive classrooms. Each component is influential upon the overall impact and success of the individualized education of the student. The growing and changing nature of the classroom has been impacted by the changes in laws at the federal level that govern how students are required to receive instruction.

Special education laws and rights have largely been identified under IDEA that guarantees specific rights to students and their families. It also identifies the process and categories upon which students can be diagnosed and ultimately, receive special education services. The historical context of special education law was initiated through the Civil Rights Movement of the 1950s and 1960s, prompting early legislation known as the Americans with
Disabilities Act. Special education law in countries such as Korea and Africa has sought to provide similar protections to students who were once not allowed to receive an education guaranteed under the law.

The shift from separation to inclusion has required the need to identify the amount of time that students are away from nondisabled peers or in the LRE. Ultimately, class placement is determined by the student’s IEP committee but implemented by local building principals. Research in this area shows the need for special education training because many administrators have a lack of understanding of the intricate policies surrounding special education. Access to FAPE governs how students in the United States are required to be educated according to specific federal guidelines. On the contrary, countries such as Korea and Turkey are seeking to change the manner in which its special needs population is being educated.

The shift in belief systems of society is impacted by the disability theory, a component of the multicultural theory. Just a minority groups have become vocal activists in maintaining basic rights, social theorists believe that people with disabilities are similar in nature because views of special education have traditionally been negative and non-inclusive. The shifts in belief systems have removed many of the stigmas once associated with mental, cognitive, and physical disabilities. The move toward educating students with special needs in the general education setting has proven that previous negative viewpoints have no basis.

The basis of this study is centered on perceived teacher efficacy, which is different from actual self-efficacy. Based on Bandura’s social cognitive theory and self-efficacy, perceived teacher efficacy relates to the human agency and behaviors that are influenced by belief systems. Secondary special education teachers in the content area of science who have not received specific training might often possess a belief system that is perceived to be effective in the
classroom environment. As a result, their specific behaviors are reflective of their affective nature according to SCT. Research identifies a quantitative measure of training in the form of professional development that is required for special education teachers to become effective presenters of content and not just skilled strategists capable of remediating low-performing students. Research shows that from the pre-service stage to inservice educators, there is a need for special education teachers to not only be advocates for their students but also possessing a solid foundation of knowledge that will increase student performance. The belief system of the educator directly impacts how science instruction is presented in the classroom in terms of multimodal instruction. IDEA identifies specific categories of disabilities which required that proficient educators be skilled providing instructional accommodations but also being skilled in knowing how instruction should be presented according to the nature of the disability. A review of current literature shows that minimal research has been conducted in terms of teacher efficacy at the secondary level in science inclusion classrooms.

Federal and state laws dictate how students with IEPs must learn. Although the implementation of this plan varies from state to state and even globally, there has been a definite transition to mainstreaming the education of students with disabilities. As a result, there is a need to analyze the beliefs held by teachers who are required to provide specialized instruction and services to this particular subset of the student population. While there are several scales that can be used to measure teacher efficacy, research shows that it is still a multidimensional concept that is difficult to view. It is apparent that effective collaboration and behavior management are areas are commonly highlighted when viewing efficacy in secondary classrooms. Further research is needed to determine how efficacy varies from one content area
to the next in order to train special education intern teachers effectively to experience longevity in this critical shortage area.
CHAPTER 3: METHODS

Overview

Review of current literature shows that teacher retention rates have continued to decline in all content areas, although there is a specific critical shortage in the area of special education. Retention rates of novice teachers who have been in the classroom for less than 5 years is continuing to decrease while the number of educators who provide special education services in diverse classroom environments is decreasing at an even more significant rate at 2.5 times the average exit rate of new teachers (Aloe et al., 2013). For those teachers who do remain in the classroom beyond the early teacher stage (greater than 5 years), it is necessary to look at how certain factors contribute to Bandura’s theory of self-efficacy or “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (de Boer et al., 2016, p. 306). Therefore, the purpose of this study was to investigate variables that may contribute to the perceived belief systems held by secondary special education teachers in a metropolitan Georgia school district.

This chapter includes a description of the specific methodology, procedures, and statistical analysis used to examine the variables of interest. In addition, a description of the subjects, sampling procedures, and site is included. The aim of the study was to view a specific teacher population of special education teachers who provided instruction in science (biology, chemistry, earth/space science, and physics). Teachers who provided instruction in the inclusion setting were those who provided instruction in a classroom with a general education teacher who was considered the teacher of record. Teachers who provided instruction in the small-group resource setting as the least restrictive environment were those who provided instruction to students in a small group of 15 or fewer students.
Research Design

The study used a descriptive, correlational research design. This research design was employed to explore relationships among the variables to determine if the independent and dependent variables were related to one another. The design allowed the researcher to describe the relationships among the variables without seeking to establish a causal connection between the variables (Polit, Beck, & Hungler, 2001). A survey method was used because surveys are common and practical tools to get information from a sample population in a convenient and economical manner (Cozby & Bates, 2011).

The independent variables in this study were number of hours of preservice training, type of preservice training, classroom setting, gender, and geographic location in the school district. For the purpose of this study, teachers who are identified as having a special education certification and assigned to a secondary science classroom (Grades 6–12) were invited to participate in the study. A secondary science classroom is identified as one that provides instruction in the content areas of middle grades science (Grades 6–8) or in Grades 9–12 (high school) content areas of biology, chemistry, earth systems, physics, or physical science. Special education teachers identified in this group may also have a certification in a field of science but it will not be required to participate. Science-related classes were not included because the class description falls under what the school district includes as the community-based program and are considered general education classes.

Current research shows that gender is a contributing factor to lower self-efficacy rates and that there is a negative correlation between teacher efficacy and teaching students with special needs (Gebhardt et al., 2015). In the specific school district where this study took place, there is a recognized distinction by the local school district between the northern and southern sections of
the county. The differences in economic growth, socioeconomic status, and makeup of the family unit are evident in respect to these two distinct locations. As a result, independent variables analyzed in the study also included (a) geographical location and (b) gender.

**Research Questions**

This study investigated the following research questions:

**RQ1:** Does the perceived self-efficacy of secondary special education science teachers differ by the number of preservice training hours they completed?

**RQ2:** Does the perceived self-efficacy of secondary special education science teachers differ between the types of preservice training programs the teachers completed?

**RQ3:** Does the perceived self-efficacy of secondary special education science teachers differ between the classroom settings (inclusion or resource) in which the teachers teach?

**RQ4:** Does the perceived self-efficacy of secondary special education science teachers differ between genders?

**RQ5:** Does the perceived self-efficacy of secondary special education science teachers differ by the school district’s geographic sections?

**Hypotheses**

**H₀₁:** There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to number of preservice training hours completed.

**H₀₂:** There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to type of preservice training completed.

**H₀₃:** There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to type of classroom setting.
H04: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to gender.

H05: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to the school district’s geographic sections.

**Participants and Setting**

This study took place in a public school district located in a metropolitan area of Georgia. This school district is divided into four geographical sections. This district is responsible for the education of approximately 95,700 students in 57 elementary schools, 19 middle schools, 17 high schools, and eight start-up charter schools. Approximately 45% of the student population is eligible for free or reduced meals. The district is racially diverse with 43% African American, 29% Caucasian, 15% Hispanic, 10% Asian, and 3% multiracial. Its last fiscal year budget (FY 2016) totaled $920.8 million with a cost per student estimated to be $9,549.

The participants for the study were drawn from a target population of special education teachers in either middle or high schools (36 schools total). Special education teachers are those who are licensed by the state of Georgia in any of the 17 fields that relate to special education certification. The Georgia Professional Standards Commission is the state governing agency responsible for issuing initial or renewal licenses to all teachers desiring to teach in the state. Participants must have provided instruction in at least one science inclusion or resource class or a combination of both and must have had the appropriate licensure field noted on a current teaching certificate. Teachers who did provide instruction in a special education setting but did not possess current licensure were excluded from the study. In addition, those teachers who were teaching on a provisional or emergency license were not allowed to participate unless a clear, renewable license was obtained prior to the start of the study.
An inclusion classroom is one in which both general and special education teachers provide varying levels of instruction to students in the classroom setting. A resource classroom varies in that it is a considered a small group setting with a limit of 15 students, all who qualify for special education services through the implementation of an IEP. These specific distinctions were necessary to select the desired target population for the study. Eligible participants had the required licensing field and provided instruction in either one or both of the specified classroom settings.

The sample of teachers selected were full-time teachers who had been employed with the school district for at least one full academic semester regardless of prior teaching experience in other school districts or settings. The teachers had successfully completed either a traditional or alternative certification program although those who are pursuing an additional degree or certification were welcomed to participate. Participants represented a variety of educational and teaching experience levels from novice teachers who possessed only bachelor’s degrees to those who had completed a terminal degree (EdD or PhD).

At the time of the survey, teachers had to be serving in the role of teacher as defined by the county’s human resources department. Teachers in the entire school district were considered part of the target population because they reflected the demographics of the county the school district served. Specifically, teachers had to be identified as providing special education instruction in a science classroom for at least one academic period during the school day. Special education support staff (special education paraprofessionals or instructional support teachers), regardless of the completion of an education certification program, were not invited to participate. In addition, any administrator who also provided special education science instruction for at least one class period per day was not invited to participate.
A minimum of 127 teachers (one at each grade level for each of the 36 secondary schools in the county) qualified for study participation. The target population in this study are teachers identified as qualified study participants were employed through the county as interrelated teachers who are certified to provide instruction to special education students either in the general education inclusion setting or through a small-group resource setting. The number of teachers sampled was 89 which exceeded the required minimum for a medium effect size with a statistical power of .7 at the .05 alpha level (Gall, 2007). Their designated licensure fields included any of the 17 identified special education fields identified by the Georgia Department of Education and the Georgia Professional Standards Commission.

**Instrumentation**

The Self-Efficacy Beliefs about Equitable Science Teaching (SEBEST) is a Likert-scale questionnaire containing 34 items to assess teachers’ self-efficacy beliefs for teaching and learning science for diverse learners (Ritter, Boone, & Rubba, 2001). The purpose of the instrument (See Appendix A) is to measure two self-efficacy constructs: personal science teaching efficacy and science teaching outcome expectancy. The personal science teaching efficacy scale consists of 17 items that question teachers about their perceived ability to affect student outcomes based on sociocultural factors such as students’ race/ethnicity, socioeconomic status, gender, and language. The science teaching outcome expectancy scale consists of the remaining 17 items that assess teachers’ beliefs that have been shown to be effective teaching; that student outcomes can be positively affected irrespective of sociocultural background (McCollough & Ramirez, 2012). Each item was linked to a 5-point Likert-scale response that ranged from (1) *strongly agree*, (2) *agree*, (3) *uncertain*, (4) *disagree*, to (5) *strongly disagree*. 
This instrument has been used in numerous peer-reviewed studies to measure science teaching efficacy (Cone, 2009; McCullough & Ramirez, 2012).

A panel of eight university faculty members was used to determine content validity of the two scales. Reliability was determined to be .82 and .80 for personal self-efficacy and .72 and .75 for outcome expectancy respectively (Ritter et al., 2001). This is considered appropriate and falls within the range for this type of survey research instrument (Ritter et al., 2001). Pearson’s \( r \) was estimated to be .70, while the Rasch analysis of data suggested good reliability at .81 and .98 for outcome expectancy and personal self-efficacy, respectively. The SEBEST is considered to be “a valuable tool for science teacher educators working in practical and research settings to assess the self-efficacy beliefs” (Ritter et al., 2001, p. 191). Teacher participants are able to complete the survey within thirty minutes or less with minimal assistance. A lower score indicates higher self-efficacy. Permission to use the questionnaire was granted by the company that holds publishing rights to the questionnaire (See Appendix B).

**Procedures**

An application request for active research was approved by the school district (See Appendix C) and the institutional review board at Liberty University (See Appendix D) prior to identifying teachers who were qualified to participate in the study. Study participants were contacted by email and invited to participate in the study (See Appendix E). The invitation included an explanation of the study, an attachment showing that the school district had approved the study (See Appendix C), and a link to the online survey.

After arriving at the online questionnaire, teachers read the consent form (See Appendix F) and were required to choose the *agree* option before being allowed to complete the questionnaire. The consent form informed the participants about (a) the purpose of the study, (b)
that they had the right to withdraw from the study at any time, (c) that their confidentiality would be protected, and (d) any known risks and expected benefits. These elements of consent were included to inform participants of inherent risks and benefits while protecting the nature of the study to ensure its timely completion (Creswell, 2013).

No specific identifying information was used and IP addresses of devices used to respond to the questionnaire were not stored by the online server. Participants were required to identify (a) their gender, (b) geographical location of their home school, and (c) the type of classroom setting in which they taught science to SENDs. In addition, participants identified whether they completed a traditional or alternative certification program. A portion of data collection also included the number of preservice training hours prior to becoming certified inservice classroom teachers. This included (a) student internship, (b) professional development, or (c) any educational workshop completed prior to entering the classroom as a full-time teacher.

**Data Analysis**

The data from the online survey server were downloaded into SPSS software and used to answer the five research questions: (a) number of preservice training hours (b) type of certification program (c) classroom setting (d) gender and (e) geographical location. Scores were calculated for the dependent variables—the personal science teaching efficacy scale and the science teaching outcome expectancy scale. Teachers who did not answer at least 80% of the items on each scale were excluded from the study. The analysis of the research questions included $t$ tests and one-way analyses of variance (ANOVA). One assumption of analysis of variance, which include both $t$ test and one-way ANOVA, is that the scale of measurement applied to the dependent variables follows a continuous or ordinal scale. The scales created from the Likert-scaled items of the SEBEST can be used as interval data in inferential statistical
testing (Boone & Boone, 2012). Norman (2010) reported that since the 1930s, many studies have shown that parametric (inferential) statistics are robust with respect to violations of the assumption of interval or ratio data. In addition, Brown (2011) reported that a number of papers have shown that Likert scales can be analyzed effectively as interval scales (i.e., Baggaley & Hull, 1983; Maurer & Pierce, 1998; Vickers, 1999).

The second assumption of analyses of variance is that the data have been collected from a representative, randomly selected portion of the total population. The third assumption is that the data are normally distributed. The fourth assumption is that a reasonably large sample size is used and the sample sizes in each analysis are equal. The final assumption is homogeneity of variance; that the standard deviations of the samples are approximately equal. These assumptions should be met when the data for each of the research questions are analyzed. The Levene’s test of homogeneity and Shapiro-Wilks test of normality were conducted on the data used to answer each research questions. When assumptions were met, the appropriate parametric test was used. If one or more of the assumptions were not met, a nonparametric test was used. The Kruskal-Wallis test replaced the ANOVA and the Mann-Whitney test replaced the \( t \) test.

Leech and Onwuegbuzie (2002) noted that researchers who employ nonparametric analysis generally either do not report effect size estimates or report parametric effect size estimates such as estimated Cohen’s \( d \). Those effect size estimates are adversely affected by departures from normality and heterogeneity of variances, so they may not be well advised for use with the sort of data that generally motivates a researcher to employ nonparametric analysis. Nonparametric procedures do not test the same null hypothesis that a parametric \( t \) test or ANOVA tests. The nonparametric null hypothesis is that the populations being compared are
identical in all aspects—not just in location. Grissom and Kim (2012) have suggested some effect size estimators for use in association with nonparametric statistics.
CHAPTER FOUR: FINDINGS

Overview

The purpose of this study was to investigate variables that may contribute to the rates at which secondary special education teachers in a metropolitan Georgia school district are leaving the profession. The independent variables are number of hours of preservice training, type of preservice training, classroom setting, gender, and geographic location (learning community) in the school district. Eighty-nine teachers clicked on the link in the email invitation and accessed the online survey. However, 15 did not complete enough questionnaire items for their responses to be included in the analysis of the research questions. Thus, the data set included responses from 74 teachers. An initial response rate was 70.1%, while the final response rate was 58.3%

Research Questions

Five research questions were investigated in the study:

RQ1: Does the perceived self-efficacy of secondary special education science teachers differ by the number of preservice training hours they completed?

RQ2: Does the perceived self-efficacy of secondary special education science teachers differ between the types of preservice training programs the teachers completed?

RQ3: Does the perceived self-efficacy of secondary special education science teachers differ between the classroom settings (inclusion or resource) in which the teachers teach?

RQ4: Does the perceived self-efficacy of secondary special education science teachers differ between genders?

RQ5: Does the perceived self-efficacy of secondary special education science teachers differ by the school district’s geographic sections?
Hypotheses

H_01: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to number of preservice training hours completed.

H_02: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to type of preservice training completed.

H_03: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to type of classroom setting.

H_04: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to gender.

H_05: There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to the school district’s geographic sections.

Descriptive Statistics

A dataset containing the responses of 74 secondary special education science teachers was used to answer the research questions. Table 1 contains a description of those teachers. Almost three quarters of the teachers were female, 60% of them taught in inclusion classrooms, and 55% were trained in a traditional university teacher training program. More teachers indicated that their learning community or geographic location in the school district was in the northwest section of the district, followed by 27% in the south, 22% in the central section of the district, and 16% in the northeast section.

The teachers responded to six categories to identify the number of preservice training hours they had completed. Almost one third indicated between 501 and 1,000 hours, 27% indicated they trained between 101 to 500 hours, and another 27% trained between 1,001 and 2,000 hours. Twelve percent trained for less than 500 hours. Two teachers indicated that they
trained for more than 2,000 hours. For purposes of analysis, the six variables were collapsed into four categories. Those teachers who indicated more than 2,000 hours of preservice training were included in the group of teachers who indicated they had trained for more than 1,000 hours.

Table 1

**Characteristics of the Sample**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>19</td>
<td>25.7</td>
</tr>
<tr>
<td>Female</td>
<td>54</td>
<td>73.0</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>Learning community</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NE</td>
<td>12</td>
<td>16.2</td>
</tr>
<tr>
<td>NW</td>
<td>26</td>
<td>35.1</td>
</tr>
<tr>
<td>Central</td>
<td>16</td>
<td>21.6</td>
</tr>
<tr>
<td>South</td>
<td>20</td>
<td>27.0</td>
</tr>
<tr>
<td>Classroom setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small-group resource</td>
<td>30</td>
<td>40.5</td>
</tr>
<tr>
<td>Inclusion</td>
<td>44</td>
<td>59.5</td>
</tr>
<tr>
<td>Hours of preservice training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 100</td>
<td>9</td>
<td>12.2</td>
</tr>
<tr>
<td>101-500</td>
<td>20</td>
<td>27.0</td>
</tr>
<tr>
<td>501-1000</td>
<td>23</td>
<td>31.1</td>
</tr>
<tr>
<td>1001-2000</td>
<td>20</td>
<td>27.0</td>
</tr>
<tr>
<td>2001-3000</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>More than 3000</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>Type of certificate program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional</td>
<td>41</td>
<td>55.4</td>
</tr>
<tr>
<td>Alternative</td>
<td>33</td>
<td>44.6</td>
</tr>
</tbody>
</table>

The teachers’ responses to the 34 items of the SEBEST were used to create two scales. Cronbach coefficient alpha was obtained for each scale (See Table 2). The reliability of the personal science teaching efficacy scale was .95, while the alpha obtained for the science teaching outcome expectancy scale was .94. These values indicated an acceptable reliability (Creswell, 2013; Moustakas, 1994).
The means and standard deviations of the two dependent variables by each independent variable are in Table 3. The responses ranged from 1 (strongly agree) to 5 (strongly disagree). A lower score indicates higher self-efficacy on each of the scales. Most of the means of the personal science teaching efficacy scale ranged from 3.16 to 3.58, indicating, on average, an uncertain perception of their self-efficacy. Teachers in the northwest learning community

Table 2

*Reliability of Scales of the Self-Efficacy Beliefs about Equitable Science Teaching Survey*

<table>
<thead>
<tr>
<th>Scale</th>
<th># Items in scale</th>
<th>Cronbach’s alpha coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal science teaching efficacy</td>
<td>17</td>
<td>.952</td>
</tr>
<tr>
<td>Science teaching outcome expectancy</td>
<td>17</td>
<td>.938</td>
</tr>
</tbody>
</table>

Table 3

*Means and Standard Deviations of SEBEST Scales by Independent Variables*

<table>
<thead>
<tr>
<th></th>
<th>Personal science teaching efficacy</th>
<th>Science teaching outcome expectancy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M*</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td>3.34</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>19</td>
<td>3.16</td>
</tr>
<tr>
<td>Female</td>
<td>54</td>
<td>3.39</td>
</tr>
<tr>
<td>Learning community</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NE</td>
<td>12</td>
<td>3.46</td>
</tr>
<tr>
<td>NW</td>
<td>26</td>
<td>2.94</td>
</tr>
<tr>
<td>Central</td>
<td>16</td>
<td>3.87</td>
</tr>
<tr>
<td>South</td>
<td>20</td>
<td>3.34</td>
</tr>
<tr>
<td>Classroom setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small-group resource</td>
<td>30</td>
<td>3.26</td>
</tr>
<tr>
<td>Inclusion</td>
<td>44</td>
<td>3.39</td>
</tr>
<tr>
<td>Hours of preservice training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 100</td>
<td>9</td>
<td>2.55</td>
</tr>
<tr>
<td>101–500</td>
<td>20</td>
<td>3.41</td>
</tr>
</tbody>
</table>
In all cases, the scale score means for science teaching outcome expectancy scale were lower than the means of the personal science teaching efficacy scale, indicating that all groups of teachers reported a slightly higher self-efficacy score for science teaching outcome expectancy than for personal science teaching efficacy. Females were more likely to report higher self-efficacy scores than males did, teachers in the NW learning community reported higher self-efficacy scores than teachers in the other learning communities, special education teachers in small-group resource classrooms reported higher self-efficacy scores than did special education teachers in inclusion classrooms, teachers with less than 100 hours of preservice training reported higher levels of self-efficacy than their cohorts with more hours of training, and teachers with alternative certificates reported higher self-efficacy scores than did teachers who completed traditional teacher training program.

**Results**

**Null Hypothesis 1**

There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to number of preservice training hours completed.
The sample sizes for the four preservice training hours categories were not equal and the Shapiro-Wilk test of normality was significant, indicating that the distributions of the two self-efficacy scales were not normally distributed in all the categories. Because the assumptions of the ANOVA were not met, the nonparametric Kruskal-Wallis test was used in lieu of the ANOVA. No significant differences were found among the levels of training hours for personal science teaching efficacy ($\chi^2 = 5.50, df = 3, p > .05$) or for science teaching outcome expectancy ($\chi^2 = 4.60, df = 3, p > .05$). Therefore, the null hypothesis was found tenable. No statistically significant differences in perceived self-efficacy existed among the levels of training hours of the special education teachers.

**Null Hypothesis 2**

There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to type of preservice training program completed.

The sample sizes for the two groups (traditional and alternative training) were not equal and the Shapiro-Wilk test of normality was significant, indicating that the distributions of the two self-efficacy scales were not normally distributed. Because the assumptions of the $t$ test were not met, the nonparametric Mann-Whitney was used in lieu of the $t$ test. A significant difference was found between the teachers for personal science teaching efficacy ($U = 484.00, n_1 = 41, n_2 = 33, p = .036$). However, no significant difference was found between the teachers for science teaching outcome expectancy ($U = 513.50, n_1 = 41, n_2 = 33, p > .05$). The null hypothesis was rejected. Teachers who trained in an alternative program indicated a perceived higher self-efficacy for personal science teaching efficacy ($M = 3.14$) than did teachers who were trained in a traditional teacher training program ($M = 3.50$). A lower scale score indicates a perceived higher self-efficacy score.
**Null Hypothesis 3**

There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to type of classroom setting.

The sample sizes for the two groups (small-group resource and inclusion) were not equal and the Shapiro-Wilk test of normality was significant, indicating that the distributions of the two self-efficacy scales were not normally distributed. Because the assumptions of the $t$ test were not met, the nonparametric Mann-Whitney was used in lieu of the $t$ test. No significant differences were found between the teachers who taught in small-group resource or inclusion classrooms for personal science teaching efficacy ($U = 622.50, n_1 = 30, n_2 = 44, p > .05$) or for science teaching outcome expectancy ($U = 554.50, n_1 = 30, n_2 = 44, p > .05$). Therefore, the null hypothesis was found tenable. No statistically significant difference existed in the perceived self-efficacy of secondary special education science teachers who taught in small-group resource or inclusion classrooms.

**Null Hypothesis 4**

There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to gender.

The sample sizes for the two groups (males and females) were not equal and the Shapiro-Wilk test of normality was significant, indicating that the distributions of the two self-efficacy scales were not normally distributed. Because the assumptions of the $t$ test were not met, the nonparametric Mann-Whitney was used in lieu of the $t$ test. No significant differences were found between the males and females for personal science teaching efficacy ($U = 432.50, n_1 = 19, n_2 = 54, p > .05$) or for science teaching outcome expectancy ($U = 409.50, n_1 = 19, n_2 = 54, p > .05$). Therefore, the null hypothesis was not rejected. There was no statistically significant
difference in the perceived self-efficacy of male and female secondary special education science teachers.

**Null Hypothesis 5**

There is no significant difference in the perceived self-efficacy of secondary special education science teachers in relation to the learning communities.

The sample sizes for the four groups of learning communities were not equal and the Shapiro-Wilk test of normality was significant, indicating that the distributions of the two self-efficacy scales were not normally distributed in all the categories. Because the assumptions of the ANOVA were not met, the nonparametric Kruskal-Wallis test was used in lieu of the ANOVA. No significant differences were found among the four learning communities for personal science teaching efficacy ($\chi^2 = 7.70$, $df = 3$, $p > .05$) or for science teaching outcome expectancy ($\chi^2 = 7.40$, $df = 3$, $p > .05$). Therefore, the null hypothesis was found tenable. No statistically significant differences in perceived self-efficacy existed among the learning communities of the special education teachers.

**Summary**

Five research questions were analyzed to determine the self-efficacy of secondary special education science teachers based on a number of independent variables. No significant differences were found between males and females or between small-group resource and inclusive classroom settings. Differences were not found among the different levels of preservice training hours or the school district’s geographic sections. However, secondary special education science teachers who completed an alternative training program scored higher perceived self-efficacy on the personal science teaching efficacy scale, indicating that their perceived ability to affect student outcomes based on sociocultural factors such as students’
race/ethnicity, socioeconomic status, gender, and language was significantly higher than teachers who had been trained in a traditional teacher training program. A discussion of these results, conclusions drawn from them, implications for theory and practice, and recommendations for future research are presented in Chapter 5.
CHAPTER FIVE: CONCLUSIONS

Overview

The purpose of this correlational study was to determine if there was a statistically significant difference in the perceived teacher self-efficacy as measured by the Self-Efficacy Beliefs about Equitable Science Teaching (SEBEST) questionnaire: personal science teaching efficacy and science teaching outcome expectancy. The study analyzed the amount of preservice training, the type of preservice training, classroom setting (small group resource or inclusion), gender, and learning community of survey participants. Shapiro-Wilk and Mann-Whitney statistical tests were used to determine a relationship among any variables. Chapter Four provided the results of statistical analysis completed for this study. Chapter Five includes a discussion of survey findings, implications for future research, and limitations of the study.

Discussion

The purpose of this study is to determine how specific factors influence special education teacher belief systems. In particular, it sought to provide an in-depth view of how educators who provide science instruction in whole group or small group classrooms possess specific beliefs about their ability to provide meaningful instruction. Research questions were first identified in Chapter 3 which details specific study methodology. This study was unique in nature in that analyzed the perceived self-efficacy of special education teachers in the specific content area of Science. A total of five research questions were analyzed to determine if a relationship existed between perceived self-efficacy and other variables such as hours of preservice training, type of preservice training, classroom settings, gender, and geographical location.

Current research notes the significance of preservice training completed by the preservice teacher. It is recommended that teacher candidates should spend 500–600 hours in public school
classrooms prior to student teaching regardless of the type of program or content area (Stein & Stein, 2012). This cumulative total is reflective of a four-year degree program consisting of practicum hours ranging from 50 to 300 during undergraduate studies. Research question one relates to the number of hours of training that secondary special education science teachers completed prior to entering the classroom. Results from the study show that in reference to the number of hours of preservice training completed, there was no significant difference among the levels of training hours. This means that teacher belief systems were not impacted by either a minimum or maximum amount of student internship, professional development or educational training before entering the classroom. According to survey responses, teachers felt confident in their ability to provide instruction with the self-reported amount of training received.

Teacher licensure can occur through three different types of certification programs: (a) local licensing agency; (b) alternative certification programs; or (c) traditional university programs. Current findings within the state of Georgia show that the top four producers of teachers include new teachers from Georgia programs, returnees, GA TAPP non-traditional programs, and lastly, other sources (teachers from other states) (McCampbell, 2015). Research question two analyzed the type of preservice training program completed by secondary special education science teachers. The results of the study showed that there was a significant difference in personal science teaching efficacy but not for science teaching outcome expectancy in those who completed an alternative certification program. In terms of this study, an alternative certification program is described as a local district, regional licensing agency, or post-undergraduate training program. The results of this study are not consistent with other similar research findings. Results from the Bleicher and Lindgren (2005) study states that preservice teachers that had a greater conceptual understanding were more likely to have
higher self-efficacy (Kirik, 2013). As it relates to students who have been identified with one of the more common disabilities, Specific Learning Disability (SLD), one fifth of secondary special education teachers who responded to a survey felt unprepared or very unprepared to teach this type of student (Ruppar, Neeper & Dalsen, 2016).

In inclusive classrooms, the delivery of instruction involves the use of diverse ways to present content to students with special educational need and disabilities (SEND). The instruction in this particular type of classroom must take into consideration the etiology and necessary intervention models needs to influence students with SEND (Hornby, 2015). Research question three looked at any differences in the classroom setting (resource or inclusion) and teacher belief systems. Results show that there was no significant difference in secondary special education science teachers. Teachers were confident in their abilities to provide meaningful instruction whether a general education teacher provided instruction in the classroom or were considered to be the teacher of record in a small group resource setting.

Research conducted by Shazadi et. al (2011) shows that there is a significant difference in relation to gender. Female teachers scored higher on self-efficacy scales due to an increased level of comfort when providing classroom instruction. It is also suggested that female teachers might seem to be more secure in the field of education since it is reflective of a female-dominated field. The results of this study completed in this particular school district do not support this theory as shown by study findings that there was no significant difference among perceived self-efficacy of special education teachers in the content area of science in relation to gender. Personal science teaching efficacy and science teaching outcome expectancy were not found to be statistically significant.
Lastly, there was no statistical significance shown in relation to the learning communities in which special education teachers in the content area of science worked. There were no significant differences in personal science teaching efficacy or science teaching outcome expectancy. Teachers who participated in the study were asked to self-report the area of the school district where they were employed. Although the demographics of each learning community differs in relation to student population and socioeconomic status, teachers possessed belief systems that reflected their ability to provide efficient and effective special education instruction in the content area of science regardless of the geographical location.

**Implications**

Bandura’s social cognitive theory (SCT) is related to the interaction between the social environment, internal stimuli, and behaviors (Swearer, Wang, Berry & Myers, 2014). Teachers who provide instruction in special education classrooms are required to have a firm knowledge of both special education law and specialized strategies aimed at reaching students who possessed any of the disability categories identified by the federal government. The ability of institutions of higher learning to be able to prepare pre-service teachers is very complex in nature. This study is important since it seeks to identify factors that may impact teacher belief systems that relate to special education instruction. Although the legal components of special education are extensive and cause an overwhelming frustration of many teachers, many teachers cite the lack of training in remaining in the field. While the teacher preparation programs are quality institutions of learning, the best education is often not enough to prepare teachers with the tools necessary to provide instruction to all types of teachers. The increase of student identification and subsequent placement in special education classrooms requires that school districts attract qualified educators who are able to provide the specialized instruction needed by
students who are identified as having a disability but also need to learn in the public school setting. In particular, the findings can be used in combination with recruitment strategies to attract educators who have completed quality alternative or traditional certification programs.

The impact of the hiring of quality special education professionals will in turn provide increased learning opportunities in science-related careers. A second effect of this study will provide the district with targeted areas of professional development. Teachers who completed alternative certification programs noted higher self-efficacy scores in comparison to other variables identified in the study. This particular study finding will allow the district to focus recruitment efforts on those institutions of higher learning and educational agencies that offer post-undergraduate coursework leading to initial certification in the area of special education as identified for the GA PSC.

**Limitations**

Known as the Dunning Kruger effect, over 50% of people hold above average personal belief systems when in fact they possess less skill and are ineffective. The absence of a standard of measurement causes many people to hold a self-assessment that is baseless and often exaggerated (Simons, 2013). The survey responses were self-reported by teacher participants. Since informal and formal teacher evaluations were not used or included, it may be possible that actual teacher effectiveness is not consistent with perceived teacher efficacy. The tendency of educators to overestimate their abilities as effective providers of instruction may have an impact on the results of the study (Type II error).

The results of this study were impacted by three possible limitations. The study included only one school district within the state. While it is possible that the results may be reflective of other school districts within the large metropolitan area in which the school was located, it may or may
not reflect belief systems held within other geographical locations within the state or region of the country. The school district is large in terms of active student enrollment which suggested a large sample population. However, there was limited teacher participation due to the start of the new school year. Teacher obligations were varied according to school but still impacted the number of teachers that were able and willing to participate due to the timing of the study. In addition, the study only looked at the content area of Science. Therefore, a generalization of all special education teacher belief systems cannot be made due to the results of this study.

**Recommendations for Future Research**

Future research in special education division within the school district may focus on the following:

1. Analysis of teacher belief systems at the end of the school year. Research can be centered around belief systems that teachers hold after providing 180 days of instruction.

2. The effect of teacher stipends on teacher retention. Teacher belief systems may differ if there are extrinsic motivators that may ultimately impact the delivery of instruction.

3. The effect of increased recruitment events. If recruitment efforts are targeted towards alternative certification program completers, it is possible that perceived TE may increase.

4. Perceived TE of special education teachers who provide instruction in more than one content area. The belief systems of teachers may differ if they are required to provide instruction in two diverse areas that they may or may not be qualified to teach.
REFERENCES


Girli, A. (2013). An examination of the relationships between the social skill levels, self-concepts and aggressive behavior of students with special needs in the process of inclusion education. *Çukurova University Faculty of Education Journal, 42*(1), 23–38.


APPENDIX A: QUESTIONNAIRE

1. Please select your gender.
2. Which learning community do you currently work in?
3. Are you a special education teacher in the school district?
4. Do you provide instruction in a Science classroom? If so, select the classroom setting below.
5. How many hours of pre-service training did you complete prior to entering the classroom?
6. Did you complete a traditional undergraduate education degree resulting in initial certification? If so, select the name of the university below.
7. Did you complete an alternative certification program resulting in initial certification? If so, select the licensing agency below.

**Appendix**

*Self-Efficacy Beliefs about Equitable Science Teaching (SEBEST)*

Directions: Please indicate the degree to which you agree or disagree with each statement below by circling a response.

- Strongly Agree
- Agree
- Uncertain
- Disagree
- Strongly Disagree

1. I will be able to effectively teach science to children whose first language is not English.
2. Girls can learn science if they receive effective science instruction.
3. I do not have the ability to teach science to children from economically disadvantaged backgrounds.
4. Even when teachers use the most effective science techniques in teaching science, some Native American children cannot achieve in science.
5. I can do a great deal as a teacher to increase the science achievement of children who do not speak English as their first language.
6. Good teaching cannot help children from low socioeconomic backgrounds achieve in science.
7. I will be able to meet the learning needs of children of color when I teach science.
8. Girls are not as capable as boys in learning science even when effective instruction is provided.
9. I do not know teaching strategies that will help children who are English Language Learners achieve in science.
10. Effective science teaching can help children from low socioeconomic backgrounds overcome hurdles to become good science learners.
11. I can help girls learn science at the same level as boys. If effective science techniques in teaching science, some children of color cannot achieve in science.
Appendix (continued).

13. I do not know how to teach science concepts to children who speak English as a second language.
14. Effective science teaching cannot improve the science achievement of children from impoverished backgrounds.
15. I will be effective in teaching science in a meaningful way to girls.
16. Children of color can succeed in science when proven science teaching strategies are employed.
17. I will have the ability to help children from low socioeconomic backgrounds be successful in science.
18. Children who speak English as a second language are not able to achieve in science even when the instruction is effective.
19. I will be able to successfully teach science to Native American children.
20. Girls have the ability to compete academically with boys in science when they receive quality science instruction.
21. I will not be able to teach science to children who speak English as a second language as effectively as I will to children who speak English as their first language.
22. Children of color cannot learn science as well as other children even when effective science teaching instruction is provided.
23. I cannot help girls learn science at the same level as boys.
24. A good science teacher can help children from impoverished backgrounds achieve in science at the same level as children from higher socioeconomic backgrounds.
25. I will be able to effectively monitor the science understanding of children who are English Language Learners.
26. Girls can develop in science at the same level as boys if they receive science instruction that is effective.
27. I will not be able to successfully teach science to Asian children.
28. Girls do not have the ability to learn science as well as boys, even when effective teaching techniques are used.
29. I will be able to successfully teach science to children of color.
30. Children who are English Language Learners do not have the ability to be successful in science even when the science instruction is effective.
31. I will be able to help girls learn science.
32. White children can learn science as well as other children when effective science teaching is employed.
33. I will not be able to teach science successfully to White children.
34. Children who are English Language Learners can be successful in learning science if the teaching is effective.
APPENDIX B. PERMISSION TO USE SURVEY

Permissions

T & F Reference Number: P071917-04

7/19/2017

Celeste Bonton
Liberty University
School of Education
1971 University Blvd.
Lynchburg, VA 24515
cbonton@liberty.edu

Dear Ms. Bonton,

We are in receipt of your request to reproduce the SEBEST survey/questionnaire instrument from the following article:

Jennifer M. Ritter, William J. Boone & Peter A. Rubba (2001)
Development of an Instrument to Assess Prospective Elementary Teacher Self-Efficacy Beliefs about Equitable Science Teaching and Learning (SEBEST)
DOI: http://tandfonline.com/doi/abs/10.1023/A:1016747713585

for use in your dissertation.

Permission is granted to reproduce all editions in print and electronic.

We will be pleased to grant you permission free of charge on the condition that:

This permission is for non-exclusive English world rights.

This permission does not cover any third party copyrighted work which may appear in the material requested.

Full acknowledgement must be included showing authors, year, article title, and full Journal title, reprinted by permission of The Association for Science Teacher Education, https://theaste.org/ (http://theaste.org/)

Thank you very much for your interest in Taylor & Francis publications. Should you have any questions or require further assistance, please feel free to contact me directly.

Sincerely,

Mary Ann Muller
Permissions Coordinator
Telephone: 215.606.4334
E-mail: maryann.muller@taylorandfrancis.com
APPENDIX C. PERMISSION FROM RESEARCH SITE

RESEARCH AGREEMENT
Teacher Efficacy of Secondary Special Education Science Teachers

This Agreement between Ms. Celeste Benson ("the Applicant") and the __________ School District ("the District") is made for purpose of the study to be conducted entitled "Teacher Efficacy of Secondary Special Education Science Teachers."

The Application for Research Study and all attachments submitted by the Applicant outline the purpose of the study, the scope of the student, and the information to be disclosed to the Applicant for purposes of this study. This Application and attached documents are specifically incorporated by reference into this Research Agreement ("the Agreement").

No changes to the information provided by the Applicant may be made without written consent of the District.

1. PERIOD OF RESEARCH. The Research shall be conducted during the period August 2017 to April 2018.

2. COSTS. There is no cost to the District to participate in this research.

3. REPORTING OF DATA. The Applicant must submit a report summarizing the outcomes of their research conducted with the District. The purpose of this requirement is to enable the District to share the findings to inform the practice of our school leaders and teachers. This report is to be submitted as soon as practicable, but no later than 6 months after completion of the research study.

4. CONFIDENTIALITY. Student, parent, guardian and personnel privacy is and must be a paramount concern. The Applicant must, in all respects comply with the provisions of privacy law including, but not limited to, the Family Educational Right to Privacy Act ("FERPA"), 20 U.S.C. 1232g; the Protection of Pupil Rights Amendment ("PPRA"), 20 U.S.C. 1232h; and O.C.G.A. 50-18-72(a)(34), as applicable. The Applicant may not maintain, use, disclose, or share student record information in a manner not allowed under Federal or state law or regulation. Student and personnel information gathered by Applicant during this research can be used for no other purpose other than the research described in this Research Agreement. Access to data will be limited only to those representatives of the Applicant’s institution with legitimate interests under the research described in this Agreement. Except as may be required by law, the Applicant will not share information received under this Agreement with any other entity or person without prior written approval from the District. The data continues to be owned by the District.

5. DATA AVAILABLE UNDER THIS AGREEMENT. The Applicant will collect her own data. The District will not be providing any additional data.
6. SECURITY AND DATA PROTECTION. Upon termination of this Agreement or three months after the publication of reports generated under the Research, whichever is sooner, the Applicant will destroy all data obtained under the agreement that contains any personally identifiable information as that term is defined in FERPA. The Applicant will promptly notify the District when they or their subcontractors become aware of any actual or potential security or data breach relating to the information shared under this Agreement. All steps to mitigate and rectify the consequences of such a breach, including notification to impacted parties, shall be undertaken by the Applicant at its sole expense. The District will be entitled as a matter of right to seek injunctive relief to prevent commencing or continuing a breach of security or data protection violation without having to post a bond or other security and without having to prove the inadequacy of any other available remedies. Nothing will be deemed to limit or abridge any other remedy available to the District at law or in equity.

7. SCHOOL ENVIRONMENT. All visitors to school property will comply with the directions of the school principal or site director. Any visitor may be requested to leave school property, and the District reserves the right to refuse access to any individual on school property.

8. PUBLICATIONS. The Applicant must have written approval prior to identifying the District in any publications or releases about the research. All publications and written releases will be provided to the District one month prior to the release or publication. The Applicant will not share information in any manner that could identify any individual school, student, parent, guardian, or personnel member. All publications will include appropriate methods of disclosure avoidance, including but not limited to, suppression, blurring, recording the ends of the distribution, protecting underlying contents, collapsing across outcome categories, perturbation techniques, and establishing minimum subgroup sizes.

9. HUMAN SUBJECTS. The use of human subjects in the Project shall comply with Department of Health and Human Services (DHHIS) policies and regulations on the protection of human subjects (45 CFR 46, as amended). The Applicant will not ask the Subcontractor to engage in the research activities. The Applicant is responsible for ensuring that all research activities comply with applicable law, will inform the District of any requirements under this paragraph, and will assist the District with steps necessary to ensure compliance.

10. TERMINATION. The District may terminate this Agreement at any time upon written notice to the other party. This Agreement will automatically terminate upon the District's termination of its Agreement with the Applicant.

11. COMPLIANCE. The Applicant will ensure that this research conforms to all requirements of this Agreement, of Board Policy and Procedure 1CC, and of all applicable federal, state and local laws, rules and regulations. All permission slips and consent forms will be approved by the Office of Accountability for the District.
12. INDEPENDENT CONTRACTOR. For the purposes of this Agreement and research, the Applicant and the District shall be, and shall be deemed to be, independent contractors and not as agents or employees of the other Party.

13. ASSIGNMENT. The activities under this Agreement shall not be assigned without the written consent of the other Party and any attempt to assign without such consent shall be void.

14. MODIFICATION. No modifications of this Agreement will be valid unless in writing and executed by authorized representatives of both the District and the Applicant.

15. CONTACTS. Written notices and other communications about the research should be directed to:

16. LIABILITY. To the extent permitted by law, the Applicant shall hold harmless and indemnify the District, its past, present and current Board of Education, and its past, present, and current employees, agents, volunteers or assignees ("the District Indemnities") from any and all claims, suits, actions, damages, liability and expenses including attorney fees in connection with (a) claims, demands, or lawsuits with respect to any activities related to this Agreement that are undertaken by the Applicant, the Applicant's subcontractors, the District, or the District's representatives or staff as a result of this Agreement; (b) the failure of the Applicant or its subcontractors to comply with any law or regulation, including FERPA or PPRA; (c) the loss, misappropriation or other unauthorized disclosure of data by Applicant or its subcontractors; and (d) any security breach involving data in Applicant's or a subcontractor's possession, custody or control, or for which Applicant or a subcontractor access or is otherwise responsible. The Applicant's obligation shall not be limited by, or in any way be, any insurance coverage or by any provision in or exclusion of omission from any policy of insurance.

17. CHOICE OF LAW. This Agreement shall be interpreted, construed, and given effect in all respects according to the laws of the State of Georgia.

District Authorizing Representative: _____________________________________________________

Applicant Authorizing Representative: ___________________________________________________

[Signature]

[Signature]

[Date: 5/1/2017]

[Date: 6/8/17]
APPENDIX D. LIBERTY IRB APPROVAL

LIBERTY UNIVERSITY
INSTITUTIONAL REVIEW BOARD

August 15, 2017

Celeste Bonton
IRB Exemption 2885.081517: Teacher Efficacy of Secondary Special Education Science Teachers

Dear Celeste Bonton,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under exemption category 46.101(b)(2), which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:101(b):

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects’ responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects’ financial standing, employability, or reputation.

Please note that this exemption only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued exemption status. You may report these changes by submitting a change in protocol form or a new application to the IRB and referencing the above IRB Exemption number.

If you have any questions about this exemption or need assistance in determining whether possible changes to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

[Signature]
Administrative Chair of Institutional Research
The Graduate School

LIBERTY UNIVERSITY
Liberty University | Training Champions for Christ since 1971
APPENDIX E: EMAIL INVITATION

Dear Special Education Teacher:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a Doctorate in Education. The purpose of my research is to identify factors that affect teacher efficacy of secondary special education teachers in the content area of Science and I am writing to invite you to participate in my study.

If you are a middle or high school special education teacher and provide instruction in an inclusion or resource science classroom, you will be asked to complete an online survey. It should take approximately 10 minutes for you to complete the online survey. Your participation will be completely anonymous, and no personal, identifying information will be required.

To participate, click on the following link to complete the online survey:

http://www.surveymonkey.com/r/teacherefficacy_celestebonton

You will be asked to complete the consent form by checking the “Agree” or “I do not Agree” in order to enter the survey platform.

A consent document is provided as the first page you will see after you click on the survey link and is also attached to this letter for your review.

Sincerely,

Celeste Bonton, Ed.S.
Principal Investigator
APPENDIX F. CONSENT FORM

You are invited to be in a research study related to the self-efficacy of secondary special education teachers of science. You were selected as a possible participant because you are employed by the school district as a special education teacher in either a middle or high school in an inclusion or resource classroom setting. Please read this form and ask any questions you may have before agreeing to be in the study.

Celeste Bonton, a doctoral student in the School of Education at Liberty University, is conducting this study.

**Background Information:** The purpose of this study is to determine if the number of preservice training hours completed as a requirement of an alternative or traditional certification program in addition to classroom setting impact teacher views.

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

1. Watch a short, 10-minute tutorial on how to complete an online survey if you are unfamiliar with this process.
2. Go to the online survey platform to complete the survey questions, which will require approximately 10 minutes to complete.

**Risks and Benefits of Participation:** The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life. Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include better recruitment strategies to attract and retain experienced teaching professionals.

**Compensation:** Participants will not be compensated for participating in this study.

**Confidentiality:** The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records.

- The survey will be completed online and participants will remain anonymous.
- Data will be stored on a password locked computer and may be used in future presentations. After three years, all electronic records will be deleted.

**Voluntary Nature of the Study:** Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time prior to submitting the survey.

**How to Withdraw from the Study:** If you choose to withdraw from the study, please exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

**Contacts and Questions:** The researcher conducting this study is Celeste Bonton. You may ask any questions you have now. If you have questions later, you are encouraged to contact Celeste Bonton at cbonton@liberty.edu. You may also contact the researcher’s faculty advisor, Jaunine Fouche, at FoucheJ@mhs-pa.org.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, you are encouraged to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 1887, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information for your records.