MEASUREMENT AND DEVELOPMENT OF AGRICULTURAL SCIENCE EDUCATION TEACHERS' SELF-EFFICACY

by

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(Under the Direction of Lorilee R. Sandmann)

ABSTRACT

Each year teachers with varying levels of education, varying routes to certification, and varying skill sets enter the agricultural education classroom. The purpose of this quantitative study was to investigate the development of teacher self-efficacy beliefs of agricultural education teachers utilizing an instrument specific to an agricultural education teacher. More specifically investigated were the teacher efficacy scores using a researcher-developed instrument specific to agricultural education teachers. Also explored were the impacts of alternative certification, personal and situational characteristics, and the predictability of constructs on identified outcomes of innovative teaching, job satisfaction, program impacts, and teacher retention.

Findings of this study indicate that agricultural education teachers are fairly efficacious in the areas of Instructional Strategies in the Traditional Classroom and Student Engagement Outside the Traditional Classroom and least efficacious in Student Engagement in the Traditional Classroom and SAE Advisor Outside the Traditional Classroom. Based on the findings of this study, Management in the Traditional Classroom efficacy is very important to outcomes of Innovative Teaching, Job

Satisfaction, Program Impacts, and Teacher Retention. This study also found that route to certification has no relationship on teacher self-efficacy development indicating that while each group had different mastery experiences they developed similar teacher self-efficacies. Further, it was determined that personal and situational characteristics are not strong predictors of teacher self-efficacy but have small varying degrees of influence. This research did find that age has a slight impact on management in the classroom further demonstrating the importance of Bandura's mastery of experiences. Also, participation in FFA as a youth by the teachers had an impact on teacher self-efficacy of Management in the Traditional Classroom and FFA Advisor outside the traditional classroom.

This instrument could be beneficial in the development of pre-service and in-service training programs by enhancing areas teachers perceive as strong and targeting the areas in which teachers perceive they are least capable. With further replication of this instrument, agricultural education preparatory programs have a strong tool for the development of quality programs and professional educators have direction for capacities to improve for career sustainability.

INDEX WORDS: Adult Education, Agricultural Education, FFA, Supervised Agricultural Experience, Teacher Self-Efficacy

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by

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DEDICATION

This dissertation is dedicated to my parents and maternal and paternal grandparents. To my Papa Moore and Papa Shelton who passed before I even made it out of 2nd grade and my Mama Shelton who passed before I made it through middle school, I know they live on in my heart and were a grand support when I was young. To my Mama Moore who passed while I was working on this dissertation, but taught me that the best thing to do when the world seems to go crazy is to grab a crayon and color until all is good. To my parents who have battled this journey with me with their love and support, you are my biggest fans and my reason for learning all I can.

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CHAPTER I

INTRODUCTION

Each year teachers enter agricultural education middle or high school classrooms, some for the very first time. These new teachers have varying backgrounds of preparation, different levels of teaching experience in the classroom, and varying degrees of teacher self-efficacy beliefs. These teachers must prepare to meet the additional tasks beyond the traditional classroom that await an agricultural science educator. An agricultural science education teacher assumes the roles of educator, coach, supervisor, mentor, and guidance counselor. The roles are utilized in the traditional classroom but also in the expanded informal setting that incorporates FFA and students' Supervised Agricultural Experience (SAE) to augment an agricultural education program. To meet the multiple roles, agricultural science education teachers in the middle and high school setting must approach the demands of teaching with a high level of commitment and a strong work ethic (Phipps, Osborne, Dyer, & Ball, 2008).

Background of the Problem

In most circumstances, individuals seeking to join the profession of agricultural science educator are required to complete either a traditional four-year degree program or an alternative preparatory program culminating in certification. Either of these routes to certification is limited in the scope of preparation to provide every necessary aspect of training. "The goal for pre-service…is to provide teachers with the core ideas and broad understanding of teaching and learning that give the [sic] them traction on their later development" (Darling-Hammond & Bransford, 2005, p. 3). Thus beginning teachers do not have the luxury of wisdom gained from years of teaching experience to confront first year difficulties and challenges. This limited training and skill development could impact their teaching self-efficacy beliefs, which are the beliefs in their capabilities or skills to obtain a certain outcome (Bandura, 1986). A higher sense of teacher self-efficacy can be "instrumental to a beginning agricultural educator's success and therefore, retention in the profession" (Wolf, 2008, p.2). Following is a discussion of teacher self-efficacy and the need for a specific measure of teacher self-efficacy as it relates to the agricultural science education teacher.

Teacher Self-Efficacy Defined

New teachers enter the classroom assessing whether they are ready for the task of teaching. They evaluate their own skills, capabilities, and competencies while weighing them against the strength of their *beliefs* in those skills, capabilities, and competencies. They evaluate their knowledge and experience to determine if a desired outcome could be achieved. This evaluation is often described as self-efficacy, a self-assessment of their belief in their capabilities (Bandura, 1994).

"Self-efficacy or perceived self-efficacy is often defined as a person's beliefs in their capabilities (skills) to effect or produce the outcome that can influence the events of their lives by effecting how they feel, think, motivate themselves and behave" (Bandura, 1994, p. 71). According to Bandura (1994), individuals with high self-efficacy often approach challenges with a mind focused toward mastery while an individual with low self-efficacy tend to shy away from challenges. Studies have shown that it is not simply the possession of skills, but also the belief in those skills, that indicate if an individual will utilize those skills successfully (Bandura, 1993; Collins, 1982).

Teacher efficacy is a form of self-efficacy that is often confused with teacher effectiveness (Goddard, Hoy, & Woolfolk Hoy, 2004). Teacher effectiveness deals only with the outcomes of the teacher and not the belief in their capabilities to achieve those outcomes (Goddard, et. al, 2004). Early studies defined teacher efficacy as the belief of the teacher's own capabilities to produce the desired outcomes in student engagement and learning (Armor, Conry, Oseguera, Cox, King, McDonnell, Pascal et al., 1976; Bandura, 1977) not just the possession of the skill of teaching. This definition has implications of not only how important are teachers' beliefs in their capabilities as a teacher but also how important it is to possess the capabilities. Simply put, it is not the belief alone but the combination of the belief with the possession of the abilities.

Teacher self-efficacy has shown to be an important predictor of productive teaching practices (Goddard et al., 2004). As such, it has been related to student achievement (Anderson, Greene, & Lowen, 1988; Armor et al., 1976; Ashton & Webb, 1986; Moore & Esselman, 1992; Ross, 1994), and it has a positive impact on teacher behavior toward implementation of new ideas to assist students (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977; Guskey, 1988; Stein & Wang, 1988). If teacher self-efficacy deals with their belief in their capabilities to obtain a particular outcome, then it is reasonable to expect teachers with capabilities and beliefs in those capabilities to be successful and effective.

Agricultural Science Teacher Self-Efficacy Development

The study of teacher self-efficacy in the area of agricultural science education is limited in its scope. Much work has been conducted looking at differences types of certification route has on the development of teacher efficacy. Agricultural science teachers who earn certification via the alternative certification route do not usually experience major components of training and development that their fellow traditionally certified agricultural science education teachers have experienced. Traditional certification routes provide a higher degree of training in the pedagogical instruction and course content that alternatively certified agricultural science education routes do not provide possibly in their shortened program discussed earlier. Malow-Iroff, O'Connor, and Bisland (2004) found that alternative certified teachers who were part of the New York City's Teacher Fellows program were undecided about general teacher efficacy (GTE) , but the personal teacher efficacy (PTE) was higher when working on instruction and student learning issues. These authors described GTE as the attitudes toward education and reaching children, while PTE reflected the teacher's personal ability to teach. Rocca and Washburn (2005) found similar results when studying Florida alternatively and traditionally certified agricultural science education teachers. Their study concluded that there was no distinguishable difference in perceived teacher efficacy. In another of their studies, it was determined there was no difference in the belief of the ability to teach of the traditionally certified agricultural science education teachers as compared to the teachers who obtained their certification via an alternative route (Rocca & Washburn, 2006).

However, this study looked at perceived teaching efficacy and discovered that differences were indistinguishable between traditionally and alternatively certified teachers who had many years of teaching experience. Rocca and Washburn (2005, 2006) recommend that future studies need to be conducted to determine whether groups of beginning or novice teachers are equally efficacious though the route to certification differs.

One commonality of a majority of the studies conducted thus far has been the utilization of a generalized form of teacher efficacy measure. Few studies exist that use instruments specific to the measure of agriculture teacher efficacy. Questions arise about the sufficiency of the generalized instruments to provide an accurate account of the uniqueness that is an agricultural science educator.

Problem Statement

There is a national teacher shortages facing agricultural education today. Shortages are arising because of a deficit in the numbers of educators completing the traditional certification or alternative certification routes, but also a long list of other factors such as job satisfaction (Gilman, Peake, & Parr, 2012), teacher departures (Tippens, Ricketts, Morgan, Navarro, & Flanders), stress and time management (Ritz, Burris, & Brashears, 2013), work life balance (Sorenson & McKim, 2014) and to the growing number of new positions in agricultural education across the country (Team Ag Ed and the National Council for Agricultural Education, 2008). Following is a discussion of the problems caused by the shortages and the need for an agricultural science teacher-specific measure of teacher efficacy.

Teacher Shortages and Teacher Self-Efficacy in Agricultural Education

Agricultural education is experiencing a shortage of qualified educators at the primary and secondary levels. This shortage is illustrated in many ways. A national study explored the demand and supply of agricultural educators for the years of 2004-2006, finding that the profession would experience an estimated teacher deficiency of 38.5% and possibly reach epidemic levels without recruitment and continued growth of existing agricultural education programs (Kantrovich, 2007). This study also indicated that only 69.8% of graduates in 2005-2006 were planning to enter the profession of teaching agricultural education. Additionally, Kantrovich noted that 40 agricultural education programs closed due to the lack of a qualified teacher. In contrast, Camp et al. (2002) reported that the number of positions related to agricultural science education has risen more than 12% over the last decade. If this trend continued, an additional 1600 new positions would have been needed by 2013 (Roberts et al., 2006). It is not only the low numbers of graduates entering into the profession that is responsible for the shortage, but also the large numbers who leave the profession early in their careers (Myers, Dyer, & Washburn, 2005).

To further add to the existing shortage is a growing number of positions for teachers overall. Team Ag Ed and the National Council for Agricultural Education (2008) have engaged in many strategic efforts to increase the number of agricultural science education programs, but the profession continues to lose ground. From 2014 to 2015, the national supply and demand study indicated growth of 253 new teaching positions and 163 new agricultural education programs. To keep pace, it requires an increase in the recruitment of new teachers and the retention of current teachers. At present the traditional certification programs are currently not satisfying the need for agricultural science education teachers, thus increasing the need for the alternative certification programs to fill the predicted positions. More than half of agricultural science education teacher positions in Florida were filled with those who had been alternatively certified (Rocca & Washburn, 2005).

Due to the abbreviated or accelerated format of many alternative certification programs, individuals who have utilized a shortened route to certification undergo less formal training in education as compared to those certified via the traditional route. Also, it is important to take into consideration the large number of new teachers with little teaching experience, no matter the certification route, that will be required to achieve the goal of meeting teacher job shortage demands. New teachers, no matter the certification route, mean little or no experience in the classroom. Lack of training in a particular skill set could result in lower self-efficacy beliefs of the new teacher (Bandura, 1997).

Novice agricultural science teachers, those within the first three years of their teaching career, do not have as much on-the-job learning as teachers with many years of experience but, do possibly have helpful experiences from a previous career, although it may have been unrelated to education. Therefore, an important missing piece for curricular and professional development (and potential national standards or policies for alternative certification), is knowledge about the role of prior incidental learning and career experience in the development of self-efficacy beliefs of novice alternatively certified agricultural science education teachers. Added to this void is the need for a more specific measure to understand more fully the development of teacher self-efficacy in agricultural science education teachers who exist as a traditional classroom teacher and an outside the traditional classroom FFA/SAE advisor. Current measures only address the general measure of teacher self-efficacy while not accounting for the unique dual roles played by agricultural science education teachers.

Measuring Agricultural Science Teacher Efficacy

The best teachers are efficacious about their ability to teach and develop positive outcomes in students (Jerald, 2007), so it is important to know what teachers are self-efficacious and ultimately how to develop self-efficacy. Previous measures of teacher self-efficacy in the area of agricultural science education have utilized different approaches for identifying teacher self-efficacy. Some of the earlier studies (Blackburn & Robinson, 2008; Harlin et al., 2007; Roberts et al., 2007; Roberts et al., 2006; Rocca & Washburn, 2006) used the Teacher's Sense of Efficacy Scale (TSES) (Tschannen-Moran & Woolfolk Hoy, 2001). The TSES is regarded by its creators, Tschannen-Moran and Woolfolk Hoy (2001), as an all-purpose type of measure of teacher efficacy because it is able to assess a broad range of capabilities that could be used to study teachers across myriad educational disciplines. This general type of instrument "limits the scope" and a more specific measure would be beneficial (Bandura, 2006).

Duncan and Ricketts (2006) and Wolf (2008) pursued a more specific measure in their studies. The former employed an instrument that was based on the Borich (1980) Needs Assessment Tool to encompass the unique and complex situation of an agricultural science education teacher. This instrument measured the area of technical agriculture, FFA/leadership development/Supervised Agricultural Experience (SAE), teaching and learning and program management to increase the specificity of the instrument. The later study used domains of teacher self-efficacy in the classroom, in FFA, and in SAE. Both of these studies shifted from the three-construct concept of the TSES, which measured the teacher self-efficacy in classroom management, instructional strategies, and student engagement (Tschannen-Moran & Woolfolk Hoy, 2001). While the three construct strategy works when taking into consideration a traditional classroom only situation, this strategy ignores the non-traditional setting that is also part of the role of an agricultural science education teacher. Thus lacking is a specific measure of teacher self-efficacy of the agricultural science education teacher that takes into consideration the traditional and non-traditional roles played by those teachers.

Purpose of the Study

The purpose of this quantitative study was to investigate the development of teacher self-efficacy beliefs of agricultural science education teachers utilizing an instrument specific to an agricultural science education teacher. Teacher self-efficacy was chosen as it has a strong foundation of theory and simply measuring behavior can be expensive and difficult to build theory around. The questions guiding this study were:

1. What are the perceived teacher self-efficacy beliefs of agricultural science education teachers?
2. What are the differences occurring in the perceived teacher self-efficacy beliefs of alternatively certified agricultural science education teachers as compared to the traditionally certified?
3. To what extent do personal and situational characteristics impact the perceived teacher self-efficacy beliefs of agricultural science education teachers?

4. To what extent is the relationship of personal and situational characteristics and self-efficacy beliefs to designated outcomes of innovative teaching, job satisfaction, program impacts, and teacher retention?

Significance

Teacher certification in the United States evolved to a state regulated process involving completion of a bachelor's degree and state examination. Recently the growing population of primary and secondary schools and issues with teacher retention has made filling teacher positions difficult. Also, the number of new teacher positions and new agricultural education programs has increased the demand for qualified teachers in the area of agricultural science education. One solution has been to utilize alternative certification programs to certify teachers. However, one would assume these teachers bring different skills and training to the classroom than a traditionally certified teacher since the preparation programs are so different. In the area of agricultural science education, the utilization of the alternative certification is one of the solutions to the shortage of teachers in the education system. As this study explored the development of teacher self-efficacy of the agricultural science education teacher, it has theoretical and practical implications on the certification routes an individual chooses to pursue.

Theoretically, this study is grounded in Bandura's (1986) Social Cognitive Theory and Bandura's (1997) Self-Efficacy Theory. If self-efficacy is the belief in one's capabilities to generate a particular outcome (Bandura, 1997), then a teacher could possibly have low self-efficacy by lacking a particular skill or set of skills. Belief in the skills or conversely the lack of belief can impact a teacher's performance (Bandura, 1997). This study focused on the teacher self-efficacy theory predicated on the findings that teaching efficacy can impact the teacher's ability to generate desired goals (Tschannen-Moran & Woolfok Hoy, 2001). Tschannen-Moran, Woolfolk Hoy, and Hoy (1998) suggested that teacher efficacy can be impacted by teacher preparation programs providing "preservice teachers more opportunities for actual experiences with instructing and managing children in a variety of contexts with increasing levels of complexity and challenge to provide mastery experience and specific feedback" (p.24). Alternatively certified agriscience teachers may not get the opportunity for pre-service teaching; therefore, they have to rely on previous career experience and perhaps a mentor who is not an agricultural educator to impact their teacher self-efficacy development. This study contributed data that explores how informal and incidental learning of second-career teachers, such as the alternatively certified agriscience teachers, impacts their teacher self-efficacy development. This information contributed to a better understanding of self-efficacy development and added to the existing theory of teacher self-efficacy.

From a practical standpoint, this study informed the professional preparation of agricultural science education teachers on either a traditional route or an alternative route by identifying the driving factors behind the development of teacher efficacy such that the preparation of the teacher can be somewhat personalized to the teacher. By understanding the development of teacher efficacy, more complete preparatory programs could be developed for the teachers. This study also informed the continuing professional development of agricultural science education teachers. This study also informs the continuing professional development of agricultural science education teachers. Understanding the transfer of previous career learning that an alternatively certified agriscience teacher possesses guides those developing preparation programs.

This type of understanding can help in the development of a more effective and fulfilling training program, thus ensuring teachers enter the classroom more fully prepared and with higher teacher self-efficacy.

This study enlightened those who develop traditional route preparation. By understanding how teachers who have had varied training develop their teacher self-efficacy, it may be possible to enhance current existing traditional route preparation programs. This research provides guidance to the developers of the professional continuing education for agriscience teachers. Understanding the areas in which teachers have low self-efficacy can inform which areas should be considered when developing the continuing professional education. As time is often a rare resource then identifying specific areas in which an agricultural science education teacher need further training could strengthen the efficiency of training that is provided. While this study draws on the perspective of agriscience teachers, the findings have implications for other types of teachers such as those who teach general science, mathematics, etc. Through a researcher-created instrument of measure to fully explore the beliefs of teacher self-efficacy in agricultural science education teachers, this study revealed an understanding of what is needed to prepare and develop teachers who have utilized an alternative route to certification and have possible previous career experience.

This chapter introduced the problem and questions guiding this research. The second chapter delves into the literature surrounding agricultural science education, teacher self-efficacy, and alternative certification routes. The third chapter lays out the methodology including the theoretical basis of the instrument and the instrument development. The fourth chapter includes the results that answer the four questions guiding this study. And finally the fifth chapter includes the summarization of findings, conclusions, implications for practice and theory, and future research.

Definitions

Agricultural Science Education: Educational programs designed to prepare students for careers and the reasoning ability to make informed choices about global agriculture, food, fiber, natural resources, and the environment (National FFA Organization, 2009).

Agricultural Science Education Teacher: Individual who has obtained certification for the purpose of middle and/or high school instruction of agricultural science education.

Alternative Route to Certification: A route consisting of a shortened program determined by the state or some non-state agency, which is pursued by an individual who has previously completed a bachelor's degree or higher degree in a field other than education to obtain certification.

Certification: Also called licensure, a process by which the agricultural education teacher meets requirements designated by their state. Requirements can vary but often include completing a bachelor's degree or a teacher preparation program at the bachelor's or master's degree level or an alternative teacher preparation program and passing a teacher certification test.

FFA: An agricultural youth organization with an emphasis in leadership, personal growth, and career development. Originally the organization was called the National Future Farmers of America, the name changed in 1988.

Supervised Agricultural Experience (SAE): A component of an agricultural education program that incorporates experiential learning and application of knowledge into the curriculum to enhance learning.

Teacher Self-efficacy Beliefs: A teacher's "judgment of his or her capabilities to bring about desired outcomes of student engagement and learning" (Tschannen-Moran & Woolfolk Hoy, 2001, p. 1).

Traditional Route to Certification: A state approved college/university based program resulting in a college degree, most often in an education field.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The purpose of this study was to examine the development of teacher self-efficacy beliefs of agricultural science education teachers. The questions giving foundation to this study were: (a) what are the perceived teacher self-efficacy beliefs of agricultural science education teachers, (b) to what extent do personal and situational characteristics impact the perceived teacher self-efficacy beliefs of agricultural science education teachers, (c) what are the differences in the perceived teacher self-efficacy beliefs of alternatively certified agricultural science education teachers as compared to the traditionally certified, and (d) to what is the relationship of personal and situational characteristics and perceived self-efficacy beliefs to designated outcomes of innovative teaching, job satisfaction, program impacts, and teacher retention.

This chapter establishes the context for the study by exploring dimensions of agricultural science education including FFA and SAE and the history of teacher certification. In addition there is discussion related to social cognitive theory, teacher self-efficacy beliefs, the measurement of this teacher efficacy, and findings from previous studies related to agricultural educators.

Agricultural Science Education, FFA, and SAE

The setting of this study is that of agricultural science education in public middle and high schools in the United States of America. Agricultural science educators teach a variety of skills including math, science, communications, leadership, management, and technology, all in the context of agriculture and agricultural science. To fully understand the importance of teacher efficacy development in agricultural education teachers, it is important to understand the context of agriculture science education teachers. Explored in the first part of this section will be the history of agriculture education to understand the role of this discipline in the public schools.

In the second and third sections, the role of an agricultural teacher and the evolution of certification of the agricultural teachers will be discussed. In the final section of this part of the literature review will be a discussion about the current issues facing agricultural education teachers.

History of Agricultural Education

Agricultural science education is a discipline that is rooted deep in the history of education and agriculture in the United States. Yet agriculture did not exist as a recognized section of science prior to the 19th century (Barrick, 1989). However, there came into existence in the United States as early as 1785, societies for promoting agriculture with the creation of the Philadelphia Society for Promoting Agriculture (True, 1969). These societies, in combination with agricultural fairs, continued to develop to share skills, traditions and to provide a place for agricultural commerce (True, 1969).

A combination of the Morrill Acts of 1862 and 1890 (Barrick, 1989) with the Hatch Act of 1887 (Hillison, 1996) facilitated the establishment of agriculture as a recognized science. The Hatch Act passed during the evolution of agriculture and agricultural education in the US to establish a more scientific base for learning and application. Between 1825 and 1850, schools and colleges began to offer courses in agriculture and by 1920, 31,000 were enrolled in agriculture science courses (Ag in the Classroom, 2006). The Morrill Act of 1862, often considered one of the cornerstones of the profession of agricultural education, is the law that “gave the impetus to the development of agricultural education in its broader sense” (Camp & Crunkilton, 1985, p. 62). The Morrill Act while strongly encouraging the teaching of agricultural education on a post-secondary level, did so at the cost of agriculture being taught at secondary school levels. It was the Hatch Act of 1887 that helped to resurrect the teaching of agriculture at the secondary levels (Talbert, Vaugh, & Croom, 2005).

Hoke Smith helped to pass the Smith-Hughes Vocational Act in 1917, which insured that agricultural science would be offered in the secondary schools (Maysilles, 2005). The Smith-Hughes Act mandated that the Federal Board for Vocational Education have the federal oversight for agricultural education, though the United States Department of Agriculture (USDA) provided assistance until 1929 (Hillison, 1996). The USDA created sample courses of study to be utilized to teach agricultural education (Wheeler, 1948), prepared bulletins and instructional materials for teachers (Ekstrom, 1969), and created lantern slides, film strips, photographs, charts, and motion pictures for the instructors (Lane, 1942).

The Smith-Hughes Act shifted the definition of agricultural education from a science-based part of academia to vocational study (Hillison, 1996). This differed some from an earlier definition that stated, “Agricultural education, as at present understood, is a comprehensive term, including instruction in chemistry, geology, botany, zoology, mechanics- embracing in short the science as well as the practice of agriculture” (Chambers’s Encyclopedia, 1889, p. 61). After the passing of the Smith-Hughes Act, agricultural education joined others in vocational oriented instruction and "de-emphasized academic instruction" (Hillison, 1996, pg. 5). However, the basis of agriculture education in science did not change.

The Hatch Act was the first attempt to provide an agricultural education beyond that taught at college levels (Talbert et al., 2005). Through experiment stations in respective states, the Hatch Act was an attempt at putting research-based agriculture into the hands of the public. The science that needed to be disseminated from the Hatch Act of 1887, resulted in the need for extension educators and teacher training for secondary education programs. Future agricultural education teachers needed to be prepared to instruct a curriculum with a basis in science (Hillison, 1996). Bailey (1908) suggested that high school agricultural education teachers be grounded in the science as well as the practice of agriculture. In reference to the agriculture teacher Bailey further stated, "he should, in fact, have a deeper and broader training, since he must use physics, chemistry, botany, and the like, in his special agricultural work" (p. 19).

Hummel suggested combining agriculture and science courses to create an agricultural general-science course to be taught during the first year of high school to solve problems of agriculture and science (Agricultural Instruction in Secondary Schools, 1913). A. C. True, director of the Office of Experiment Stations, recognized the need for educating those at levels less than collegiate and thus encouraged the need for secondary agricultural education (Moore, 1987). True recommended the experiment stations become a way to provide local agricultural education programs. Soule also encouraged the connection of experiment stations and secondary agricultural curriculum (Agricultural Instruction, 1913).

Agricultural education, which was born out science, then went in the direction of a more vocational type of education at the urging of Charles Prosser (1939). The Smith-Hughes Act of 1917, of which Prosser is conserved the architect, helped to provide federal funding and guidance, and instituted the vocational direction for secondary education (Gordon, 1990; True, 1969). With the passing of the Smith-Hughes Act, secondary agricultural education found a place among the federal education system and was governed by the local school systems, state boards of vocational education, and Federal Board of Vocational Education (True, 1969). Early on agriculture education utilized both classroom and practical experiences. This approach incorporated Dewey's (1938) philosophy of developing an individual beyond the training to a trade. Also part of the early instruction of agricultural education included the application of what was learned in the classroom via a supervised experience often on a farm.

The National FFA Organization, born in 1928, was created to develop premier leadership, personal growth, and career success or life skills of the students through secondary agricultural education (Bender, Taylor, Hansen, & Newcomb, 1979). FFA was and remains one of the main components of vocational agriculture; now called agricultural education or agricultural science education, and is utilized as a great motivator of students (Phipps, 1980). FFA was structured on the three levels of the local chapter, state association, and national organization. Members of FFA are encouraged to participate in the three areas classroom/laboratory work in agricultural education, membership in FFA, and participation in supervised agricultural experience (SAE) that are a part of the larger program, called agricultural education (The National FFA Organization, 2015).

Following the Hatch Act, The Morrill Act, and Smith-Hughes other federal laws and even a professional society was initiated. The FFA Foundation began in 1944 to provide support for vocational agriculture programs through FFA (Camp and Crunkilton, 1985). The National Vocational Agriculture Teachers Association (NVATA), now called the National Association of Agricultural Educators (NAAE), began in 1948 as a means of promoting professionalism among the teachers (Camp & Crunkilton, 1985). Public Law 740 was passed in 1950 to provide the National FFA Organization with a federal charter and status as an integral part of a total program of vocational agriculture/agricultural education (Camp & Crunkilton, 1985). The Vocational Act of 1963 expanded content beyond that of production agriculture thus opening agriculture to a changing society (Talbert et al., 2005). This act also expanded the definition of agriculture beyond the training of farmers incorporating the science (Camp & Crunkilton, 1985). In 1969, the last technical barrier to women involvement was removed as women were allowed into FFA.

Agriculture education continues to grow and meet the needs of the society. In the 1980s, reports made by the National Academy of Sciences indicated there were issues in the subject areas of science and mathematics. These reports resulted in higher standards developed for these areas, which could have hindered the development of agricultural education. However, the importance of the practical experience in agricultural education furnished a pathway for the inclusion of agricultural education in science and mathematics. In fact the National Research Council (1988) recommended that secondary agricultural education expand beyond the standard production agriculture curriculum and include information regarding all agriculture related careers. Following this the National

Council for Agricultural Education (2000) created *The National Strategic Plan and Action Agenda for Agricultural Education: Reinventing Agricultural Education for the Year 2020*, which set forth mission and goals for the agricultural education program. The National Research Council released *Transforming Agricultural Education for a Changing World* (2009), which stated, "this is the era of 'scientific agriculture'" (p. 16). Agriculture education now encompasses genomics, ecology, chemistry, engineering as well as many other science disciplines; this makes the role of the educator in agriculture intensely complex.

The Role of an Agricultural Science Teacher

The Agriculture Teacher's Creed states that the teacher's role extends beyond that of classroom instruction as the educator and seeks to impact the student's development (NAAE, 2011). Agricultural science education teachers live in two worlds educationally. Like general science teachers they fulfill a role of educator in a traditional formal classroom. That is not the only role of this teacher; agricultural science teachers also fulfill the role of mentor or advisor in the informal, outside-the-classroom setting of FFA and SAE. According to the NAAE (2010) agricultural science educators are teaching in the classroom and laboratory, visiting students in the field, preparing teams for FFA Career Development Events (CDE's), or leading a community service activity within their FFA chapter. As mentioned earlier, FFA members are strongly encouraged to participate in three-fold program consisting of classroom/laboratory work in agricultural education, membership in FFA, and participation in SAE (National FFA Organization, 2010).

Hedges (2000) reported that teachers had four functions: teaching, administration and management of a program, occupational and/or subject area specialist, and student counselor, friend, and role model. This is similar to the six roles identified by the *Local Program Success (LPS)* model designed to provide resources and direction to educator to improve the local agricultural education programs (National Council for Agricultural Education, 2002). These six roles of LPS are to provide: (a) strong classroom and laboratory instruction, (b) supervised agricultural experience programs, (c) active FFA chapters, (d) strong community and school partnerships, (e) program planning and marketing, and (f) professional and program growth. The Vocational Agriculture Teachers Association of Texas provided a job description of an agricultural education teacher that listed three areas that helped to create a successful agricultural education program (2009). These three areas, formal classroom instructional program, strong FFA/leadership development program, and SAE programs, were part of a list of fifteen. However, the three were commonly found on previous lists created by other groups. These three areas will be the concentration of the following discussion in the roles of an agricultural education teacher.

These teachers fulfill the traditional classroom role by creating hands-on lessons and teaching about cutting edge topics such as cloning or satellite mapping (National Association of Agricultural Educators, 2010). The agricultural science education teacher must cover all aspects of agriculture when developing a learning program, often serving as a subject area expert for many subjects for many students. The first responsibility of the agricultural education teacher is to facilitate a strong classroom and laboratory experience via formal instruction (Hedges, 2000). According to the Georgia Department of Education (2006), agricultural science education teachers are responsible for curriculum covering up to 29 different courses, including courses in agricultural leadership and development, agricultural mechanics technology, general horticulture, landscape design and management, forestry, biotechnology in agriculture, and food and fiber science technology. To facilitate the strong classroom, the teachers must stay current on knowledge and continually update classroom instruction to meet the needs of the students. However, the classroom is not the only one of the three parts in which learning occurs because the educator must employ instruction in the FFA and SAE sections as well.

The second component of the complete agricultural experience as recognized by the National FFA Organization is that of the SAE program. The SAE, or supervised agricultural experience, has its foundations in the Dewey (1938) philosophy of basing education on personal experiences of a learner. An agricultural education teacher, Rufus Stimson used this approach as early as 1908. Stimson encouraged students to utilize experiences gained in projects at home as a source for class work. This gave birth to the idea of home projects (Stimson, 1920) or what is now called a supervised agricultural experience (SAE). The SAE became a part of the mission statement of agricultural education with the passing of the National Vocational Act of 1917 (Dyer & Osborne, 1995). Phipps and Osborne (1988) define the SAE as "…all the practical agricultural activities of educational value conducted by students outside of class and laboratory instruction or on school-released time for which systematic instruction and supervision provided by their teachers, parents, employers, or others" (p. 313). Teacher attitudes and expectations can strongly influence the SAE participation by students (Dyer & Osborne, 1995). The role the teacher plays in an SAE program is that of an advisor or counselor as they help students plan, carry out and evaluate the experience (Talbert et al., 2005). This assistance occurs beyond the role played by the teacher as instructor inside the traditional formal classroom and often occurs outside the traditional school hours. The supervision of multiple SAE projects puts the teacher in the unique position of becoming knowledgeable across a broad base of applications of agricultural sciences. They must also take on the role of manager of the numerous different relationships involved in the SAE experience.

The third area recognized, as integral to the agriculture education experience by the National FFA Organization, is FFA, a student-run organization. It is similar to SAE as it occurs outside the traditional formal classroom. Also like SAE it does reinforce the classroom instruction. The teacher serves in the role of advisor to students in the student organization (Talbert et al., 2005). Teachers advise and guide the student-run organization. Both FFA and SAE are programs that involve counseling, advising, and guiding students beyond the traditional role of instructor that awaits the teacher in the formal classroom.

The unique elements of SAE and FFA, along with the traditional classroom role create a unique teacher: the agricultural education teacher. Beyond that of a traditional classroom instructor, agricultural science education teachers take on the roles of advisor and counselor. These roles are what help to create successful programs in agriculture education.

Evolution of Teacher Certification

Certification for teachers is not entirely a new process; however the means by which a person receives a certificate or license to teach has evolved from its humble start. In the 1700s, while many students were home schooled, public education was provided by religious organizations and the clergy of those organizations within a local area (Dial & Stevens, 1993). The clergy typically did not receive training in pedagogy and there existed no programs to provide training to teach.

Changes in the education system occurred in the early 1800s with the establishment of free public schools resulting in demand for teachers who were often young unmarried women (Dial & Stevens, 1993). There still existed no process by which certification was obtained by the teachers; at most the only requirement was that the teacher be of good moral character. Therefore the first type of certification was created, however this certification was not based on educational study. Rather it was a moral certificate based on a declaration of the individuals involvement in church activities, refraining from conduct such as dancing and immodest dressing, promising not to encourage familiarity with male students, to sleep the required eight hours a night, a promise not to fall in love, maintain a healthy diet, and remain in good spirits (Peterson, 1971).

In 1823, the first of schools to train teachers, often called normal schools, was opened in Concord, Vermont (Dial & Stevens, 1993). These schools initially started as a form of continuing education or in-service training as the intended audience consisted of individuals who held teaching positions. Eventually the short-term training grew into longer sessions that prepared, as well as trained the teachers. These types of schools lead to the replacement of the moral certificate with a certificate indicating completion of a normal school. A limitation of the normal schools was that training was limited to those involved in elementary education. The change to include secondary education gradually occurred through the 1800s (Dial & Stevens, 1993).

By 1843, superintendents of states were issuing certificates that differed in the subject matter and also issued certificates which would allow an individual the freedom to teach anywhere within that respective state (Angus, 2001). It was at this time that certification exams included testing of pedagogy (Feistritzer & Haar, 2008). In the late nineteenth century, states began to push for authority over teacher certification or licensure as New York, Rhode Island, and then Arizona required teaching certification be issued by state officials (Angus, 2001). It was not until the mid-twentieth century that 38 other states began to require state officiated certification. Certification has grown from the moral certificates issued by local clergy in the 1800s, to the passing of an oral exam to prove the teacher had more knowledge than the older students given by local officials, to finally state regulated control of the teacher licensure. State certification boards became the way by which individuals were certified. By 1911, 27 states had a process by which certification was obtained through procedures with the state or county. And finally by the end of the early 20th century, the requirements to obtain certification for teaching had become a list of a high school diploma, a normal or teaching training school diploma, and an examination (Dial & Stevens, 1993).

The actual teacher training was conducted by the normal schools from their inception in the early 19th century to the 1940s. The early normal schools provided the equivalent to a two year post-eighth grade education, just enough that teachers would know more than their older students. As the population of students who had completed elementary school grew, the need for the secondary education increased. With the population growing, there was a demand for better-qualified teachers in America. It was not until after World War I that a drastic change in teacher certification took place. A four-year college degree soon replaced the training that most individuals had received from normal schools. In fact by the 1950s most normal schools had ceased to exist (Dial & Stevens, 1993). In the 1960s issues facing acceptance of the education degree into the academic world of college of universities still existed. The requirements of the traditional route to certification vary depending on the state in which an individual is seeking certification (Darling-Hammond, 1990).

Traditional Certification Route for Agricultural Science Education

Traditionally individuals seeking to become teachers in middle and high school agricultural science education had to complete at least a baccalaureate degree in agricultural science education and complete the state certification procedures. In the United States, more than 11,000 teachers provide instruction to over 600,000 students ranging in subjects of agriscience, biotechnology, agricultural mechanics, horticulture, and environmental science (National FFA Organization, 2009). Typical of the national curriculum, agriscience curriculum in the state of Georgia consists of three areas: classroom/laboratory learning, the Supervised Agricultural Experience Program (SAE), and FFA (National FFA Organization, 2009; Georgia Department of Education, 2006). The classroom/laboratory learning area includes classroom experiences to explore theories and concepts dealing with a broad spectrum of agricultural and agribusiness topics and laboratory experiences to apply the theories and concepts learned in the classroom through hands-on practical activities. The second area, SAE, allows students to work and learn in real-life situations whether it is a home project, some form of entrepreneurship, or cooperative work experience in production or agribusiness. The final area is FFA, created in 1928 (National FFA Organization, 2009), provides an avenue by which students can develop leadership skills beyond the classroom.

At the University of Georgia the program in Agricultural Education offered by the Department of Agricultural Leadership, Education, and Communication (ALEC) requires students to complete 60 hours of core courses. In addition to the core, students must complete 60 hours in introductory agriculture courses, agriculture support courses, and agriculture related electives in courses such as entomology, crop and soil science, biological sciences, forestry, horticulture, plant pathology, plant genetics, poultry science, and so on (Agricultural Leadership, Education, and Communication: Academics, 2008). The 120 hours are divided among core courses, pedagogical courses including field experiences, and agriculture and agricultural science content knowledge. The final step to receive certification is to pass the state certification examination.

Alternative Path to Certification

Alternative teacher certification is any route other than the traditional route described above. A version of the alternative route to certification was used in the 1960s to answer the teacher shortage occurring as student populations rose from the baby boomer generation (Dial & Stevens, 1993). These programs were discontinued in the 1970s as the demand for teachers had been met and now a pupil shortage was occurring. By the 1980s educational reforms were needed, as the demand for education remained essential to America. Virginia established the first statewide alternative route to certification program in 1982, with California following in 1983 and Texas in 1984 (Zeichner & Schulte, 2001). Although credit should be given to New Jersey as an initiator of change as this state began to debate the existing traditional college-based route in the late 1970s (Dial & Stevens, 1993). New Jersey's version of the alternate route to certification was the one to catch national headlines with its establishment in 1983. This program was to solve the need for quality teachers by transitioning liberal arts graduates into elementary and secondary teaching by forgoing the traditional university education program (Feistritzer & Haar, 2008). By 2003, 46 states and the District of Columbia offered a program of some form by which to certify teachers by alternative means. The programs offered beyond the traditional college teacher education programs have grown to more than 144 different routes and by the year 2006 there existed an estimated 385 alternate route programs (Feistritzer & Chester, 2003; Feistritzer & Haar, 2008).

Alternative Certification and Agricultural Science Education

One area of education in which alternative certification is being used to address the teacher shortage is agricultural science education. Agricultural science education is a very broad subject encompassing the integration of chemistry, genetics, physiology, and zoology in the studies of plants and animals (Moss, 1985). Traditionally an individual seeking to teach agriscience to middle or high school students would complete a bachelor's degree program in agriscience education and complete the state certification procedures.

However an alternative to this traditional route involves a much-shortened route to certification for the individual possessing a bachelor's degree or higher in a field of study related to agriculture. For example, John Ricketts (personal communication, October 14, 2007), Assistant Professor and Coordinator Department of Agricultural Leadership, Education, and Communication (ALEC), described the alternative certification program for agriscience at the University of Georgia as one offered to those admitted to the graduate degree program in ALEC as a degree or non-degree seeking student. The individual must then complete a special needs course and a technology education course. Other required coursework must be completed in program management, curriculum development, and instructional strategies in agricultural education. The individual must then pass certification and acquire a job in which they will be evaluated twelve times over the course of two semesters. By comparison the traditional route to certification is the completion of a bachelor's degree program in agricultural science education. When compared to the alternative route, the traditional route individual should have more knowledge and skills training related to teaching than the alternative route.

The increasing number of agricultural science education programs is escalating the demand for alternative certification programs to fulfill the many open teaching positions. In 2007, thirty-three students completed the traditional route to certification at The University of Georgia while approximately seven students completed the alternative route. That same year there were more than twenty agricultural science education positions unfilled in Georgia's middle and high schools (John D. Ricketts, personal communication, April 27, 2007). In, 2015, twenty-five students completed the traditional route to certification at the University of Georgia with about forty-five teaching positions open in the state of Georgia (Kathleen Kelsey, personal communication, November 23, 2015). This shortage of agricultural science education teachers is not unique to Georgia as it is occurring nationwide. Shortages of teachers are occurring because of a growing population of students (Camp, Broyels, & Skelton, 2002), increase in the number of programs, and issues with retention and attrition.

Rocca and Wahsburn (2005) reported that over half of new agriculture education teachers in Florida were certified via the alternative certification route. In 2001, 242 agricultural science education teachers nationally obtained certification via an emergency route (Camp et al, 2002) so school administrators could fill vacant positions with either those who had obtained emergency certification, a temporary licensure used during times of demand, or alternative certification (Roberts & Dyer, 2004; Feistritzer, 1999). Some researchers predict future shortages (Roberts, Harlin, & Ricketts, 2006).

Summary

Agricultural science education is a young discipline when compared to subject areas such as math or biological sciences. But this area of study has existed far longer than its official recognition, as an area of science would indicate. Multiple federal acts, such as the Morrill Acts and Smith-Hughes Act, not only identified agriculture as a science but, insured that this subject would be taught in the secondary schools. So those changes in policy allowed agricultural science education teachers to become a part of the fabric of education. Over time these teachers of agriculture have evolved to become a teacher in the traditional formal classroom and a coach/advisor in the informal setting of FFA and SAE. While some similarities in responsibilities are shared between the two settings, there is enough difference between the two to say that the teachers live in dual educational worlds.

The process by which teachers are trained and certified for the classroom has evolved from the practically non-existent to today with multiple paths to the classroom. Initial certification relied on an individual's declaration of good moral standing, which relied less on the subject matter to be taught and more on the behavior of the individual seeking to be a certified teacher. Later, the certification process began to incorporate subject matter training, eventually evolving into four-year education degree programs. These programs, often referred to as traditional certification programs, are falling short in terms of fulfilling the teacher positions required to educate our society. From this shortage of teachers was born the alternative certification route. This certification route is not limited to the disciplines of math and science. It has become a method by which teacher shortages occurring in the agricultural science education areas are being addressed.

Self-Efficacy Theory

The theory central to this study is Bandura's (1986) theory on self-efficacy. Self-efficacy to those not familiar with the theory might consider it to be simply defined as self-confidence. Most likely these individuals would be missing that while confidence only implies the strength of belief and they do not take into account that self-efficacy assessment includes "an affirmation of a capability level" to achieve a positive outcome as well as the confidence or strength of the belief (Bandura, 1997). The following is a discussion of the social cognitive theory from which the theory of self-efficacy teacher efficacy was derived. The remainder of the discussion will center on the development and definition of self-efficacy and teacher efficacy. Also considered will be the methods by which these concepts have been measured especially in the context of agricultural science education teachers.

Social Cognitive Theory

Self-efficacy theory was derived from and is considered an essential part of the social cognitive theory (Bandura, 1977, 1986, 1994, 1997) which focuses on how individuals are not so much reactive but rather shaped by self-regulation, self-reflection, and self-organizing. Bandura drew upon modeling, cognition, self-regulatory ideas, and self-efficacy to develop the social cognitive theory. One theory of social learning introduced by Miller and Dollard (1941) rejected the behaviorists' ideas of an association and instead took on the drive reduction principles approach. Bandura and Walters (1963) added to the social learning theory principles of observational learning and vicarious reinforcement. Bandura recognized there was a component missing for the then accepted social learning theories and his own social learning theory. In the 1977 publication of *Self-efficacy: Toward a unifying theory of behavioral change* the missing component of self-beliefs was introduced (Bandura, 1977).

Social cognitive theory is the idea that individuals are proactively engaged in their own development and can make things happen by their own actions. Bandura (1986) furthered the definition of the social cognitive theory giving a central role to the cognitive, vicarious, self-regulatory, and self-reflective processes to the adaptation and change of an individual. The ability of a human to function is dependent on the interaction of personal, behavioral, and environmental. This thought is the basis of the concept of reciprocal determinism (Figure 2.1) (Bandura, 1986). The interactions of the personal factors of cognition, affect, and biological events, with behavior and environmental influences result in triadic reciprocality (Pajares, 2002). To further indicate a change from and to distance his theory from the existing social learning theory, Bandura changed the name social learning to social cognitive. This change also emphasized the role that cognition plays in the individual's ability "to construct reality, self-regulate, encode information, and perform behaviors" (Pajares, 2002, ¶2).

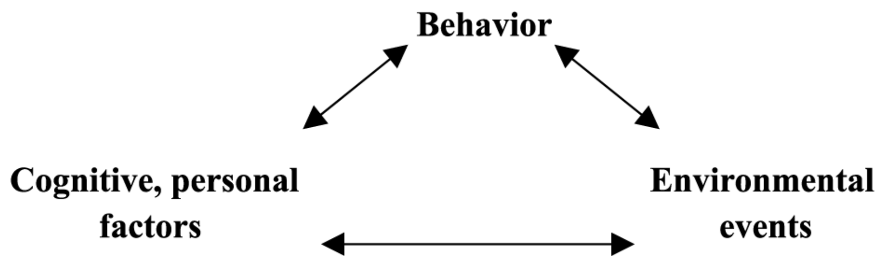

Figure 2.1. Conceptual model of triadic reciprocality in Social Cognitive Theory (Bandura, 1986).

This new social cognitive theory differed from the theories of human functioning that often overemphasized the role of environmental facts of the development behavior and learning. Those particular theories gave little credit to the capability of introspection. Pajares (2002) suggested that Bandura felt that "a psychology without introspection cannot aspire to explain the complexities of human functioning" (¶4). Individuals make sense of their own psychological processes by utilizing the introspection observation. In fact, Bandura (1986) suggested "a theory that denies that thoughts can regulate actions does not lend itself readily to the explanation of complex human behavior" (p. 15). The social cognitive theory also differed from the existing theories of human function that relied heavily on the impacts of biological factors on the development of human development and adaptation.

One key principle of this social cognitive theory is that aside from the personal and environmental factors, individuals possess the self-beliefs that facilitate their control over their thoughts, feelings, and actions. In other words individuals have potential to influence change, regardless of his/her skills (Pajares, 2002). Simply put humans function via the interaction, though not necessarily equal, of their personal, behavioral, and environmental influences. Bandura (1986) stresses these influences have an impact on each other as well as the overall impact on self-efficacy. Social cognitive theory is ingrained with the premise that the individual is in control of their development and results are obtained by their actions. Individuals possess personal self-beliefs that impact the thoughts, emotions, and actions, meaning, "what people think, believe, and feel affects how they behave" (p. 25). Of all the things Bandura considers as an impact to human functioning, ability to symbolize, to use forethought, to learn vicariously, to utilize methods of self-regulation, and to use self-reflection, it is the last capability that he considers the most "distinctly human" (p. 21). It is this self-reflection that leads an individual to make observations on their own capabilities. This places self-efficacy as one of the cores of social cognitive theory (Pajares, 2002).

Self-Efficacy Theory Defined

Self-efficacy, or perceived self-efficacy, is often defined as a person's beliefs in their capabilities to effect or produce the outcome which can influence the events of their lives by effecting how they feel, think, motivate themselves, and behave (Bandura, 1994). The stronger a person's self-efficacy the more enhanced their accomplishments and well-being. According to Bandura (1994), individuals with high self-efficacy often approach challenges with a mind focused toward mastering while an individual with low self-efficacy tends to shy away from challenges. Self-efficacy has an effect on individual goals and challenges individuals set for themselves; the higher the individual's self-efficacy the more challenging the goals set and more often the higher the level of commitment to these challenges (Bandura, 1993). Studies have shown that it is not simply the possession of skills but also the belief in those skills that signify if an individual will utilize those skills successfully (Bandura, 1993; Collins 1982). Maddux (2002) stated that a self-efficacy belief plays a crucial role in psychological adjustment, psychological problems, and physical health but that it is not a perceived skill. Rather self-efficacy is belief in the skill in certain conditions that may be stressful.

Self-efficacy has an impact on how individuals think, feel, behave and how they motivate themselves (Bandura, 1994). In terms of motivation, those who dwell negatively on their capabilities are more likely to have a lower self-efficacy (Bandura, 1993). This does not simply translate into if a person believes and visualizes success they will automatically succeed, it must be understood that the possession of the skill is as important as the belief in ones capability in that skill or ability. Individuals with a low sense of self-efficacy are more susceptible to stress and depression, these individuals also are more likely to admit defeat earlier than an individual who has a higher sense of self-efficacy (Bandura, 1994).

But where does self-efficacy originate or how does an individual develop their perception of their self-efficacy? Bandura (1994) determined that self-efficacy in people is developed through four influences. One of those influences is through mastery experiences. Bandura (1994) stated that successes would build a strong efficacy while the failures undermine self-efficacy especially if these failures occur prior to the development of a firm sense of self-efficacy. Yet, a strong resilient sense of self-efficacy is developed when individuals learn to overcome obstacles thus embracing a perseverant effort. The practice of the individual's skills in a possible stressful or challenging situation is beneficial in developing a strong, flexible sense of self-efficacy.

Self-efficacy can also be built through experiences provided by social models like mentors or coaches. Bandura (1994) associated this to experiencing vicariously, in other words sometimes seeing someone else with similar or identical skills achieve success will foster the observers' self-efficacy. In addition to a mentor type relationship, social persuasion can impact the development of efficacy. The social encouragement of an individual or persuasion that the individual has the capabilities to master some experience can help to develop a strong perception of self-efficacy (Bandura, 1994). However, if the person does not possess the skills, this can also help to foster a false sense of efficacy. The final way in which self-efficacy is developed is based on the individual's "somatic and emotional states in judging their capabilities" (Bandura, 1994). By reducing the individual's stress reactions and their negative outlook then the perceived self-efficacy can be modified as they may then interpret their physical reaction to mean something different.

Considering much of self-efficacy is perceived, it is the effect of the four modifiers described in the previous paragraph that changes the way in which self-efficacy effects four human processes: cognitive, motivational, affective and selective that becomes important. Bandura (1994) best described the cognitive process as "much human behavior, being purposive, is regulated by forethought embodying valued goals" (p. #). As discussed earlier, those individuals who have a higher perceived self-efficacy set more challenging goals, most likely these individuals will use more thought in their attempt at success of those goals. As for someone who has a lower perceived self-efficacy these individuals often set lower goals and due to self-doubts they lower their aspirations or performance quality. The self-regulation of the motivational process is guided by the beliefs or feelings one has resulting in the type of goal they set for themselves, how much effort they put forth toward the goal, determines the level of perseverance they have if they face difficulties, and their ability to be resilient in the face of failure (Bandura, 1994).

Bandura (1994) described the affects to the affective processes, as whether an individual believes they can control stressful situations; in other words are they are able to cope. The affective process governs the emotional state of the individual. The final process was that of selection, the individual's efficacy beliefs shape the choices made by the individual.

Teacher Self-Efficacy

Teacher efficacy, a form of self-efficacy, while appearing simple enough may actually be more complicated than that defined by earlier researchers. Teacher efficacy, shortened form of teachers' sense of efficacy, is often confused with teacher effectiveness (Goddard et al., 2004). One the earliest definitions of teacher efficacy was provided by RAND based on a theoretical framework by Rotter (1966) as being the extent by which a teacher could control the reinforcement of their actions, or for example teachers could influence student motivation and learning. Teacher efficacy was defined in other early studies as the belief of the teacher's own capabilities to produce the desired outcomes in student engagement and learning (Armor et al., 1976; Bandura, 1977). This definition puts forth a lot of implications of how important teacher beliefs in their capabilities are to their careers as teachers but also how important is the possession of the capabilities. A teacher's self-efficacy beliefs radiate through to impact the students; in fact the self-efficacy of the students would be impacted by the possible mentor type relationship.

Berman et al. (1977) defined teacher efficacy as being related to the teacher's belief in their capabilities to affect student performance. Guskey and Passaro (1994) linked teacher efficacy to not only the belief that teachers had in affecting learning but also related it to dealing with difficult students. It was Bandura's (1977) work that associated teacher efficacy to a type of self-efficacy, which was defined as a person's belief about their capabilities to perform or achieve at a particular level. Bandura (1997) furthered defined efficacy to include what the beliefs influenced ranging from the amount of effort a person put forth to how a person handled stressful situations. Whittington et al. (2006) related self-efficacy to how well a person learned knowledge or skills.

Tschannen-Moran et al. (1998) defined teacher efficacy as "the teacher's belief in his or her capability to organize and execute course of action required to successfully accomplish a specific task in a particular context" (p. 233). Teacher efficacy can be furthered defined by dividing it into two subsections of general teaching efficacy (GTE) and personal teaching efficacy (PTE) (Tschannen-Moran & Woolfolk Hoy, 2001). The meaning of GTE has been debated by researchers resulting in the use of many labels (Tschannen-Moran et al., 1998). This construct of teaching efficacy has been described as the "external influences" (Emmer & Hickman, 1990) or "outcome expectancy" (Riggs & Enochs, 1990). The GTE is related to factors which exist beyond the individual capabilities of the teachers, but teachers have a belief they can have an influence on these factors such as the value placed on the education at home (Tschannen-Moran & Woolfolk Hoy, 2001). The PTE is more specific to the individual and their beliefs about what teachers can achieve (Tschannen-Moran & Woolfolk Hoy, 2001). It is this teaching efficacy that has been shown by researchers to have an impact on student achievement (Armor et al., 1976; Berman et al., 1977).

Summary

Self-efficacy cannot be equated with self-confidence, to equate the two removes the "affirmation of a capability" or self-assessment aspect from the definition of self-efficacy. The social cognitive theory finds a basis in that individuals can be proactively engaged in making things happen. Self-efficacy takes this a step further by incorporating a person's beliefs in their capabilities to achieve a certain outcome. It is not simply the possession of the skills that result in the success; rather it is the combination of the skills and the belief in those skills that will result in success. For this study, the lens of self-efficacy was further focused on teacher self-efficacy in order to acquire the specificity for the particular group of agricultural science education teachers. Teacher self-efficacy centers on the beliefs the teacher has in their capabilities to achieve that educational related outcome.

Measuring Teacher Self-Efficacy

There have been many different approaches to the understanding of teaching self-efficacy ranging from the defining of the theory to the measurement of the construct (Dellinger, 2002; Guskey & Passaro, 1994; Tschannen-Moran et al., 1998). Teacher efficacy measurement is derived from two different concepts, Rotter's (1966) concept or Bandura's (1977) theories. Following is a brief description of these two concepts.

Rotter and Rand Measurement

The first concept of which efficacy measurement has been developed is Rotter's (1966) concept of generalized expectancies of reinforcement. Rotter (1966) approached behavior as being something that an individual learns through their interaction with the environment and that the individual's personality is the set of behaviors for dealing with situations. Rotter's (1966) concept is considered very similar to the definition of teacher efficacy and labeled the locus of control, which is defined as the origin of the perception of one's behavior. The construct of locus of control is defined as "…a generalized expectancy, operating across a large number of situations, which relates to whether or not the individual possesses or lacks power (or personal determination) over what happens to him" (Battle & Rotter, 1963, p. 482). Battle and Rotter (1963) discussed that teachers had beliefs about the level of control over events in their classrooms and that these classrooms existed in the internal and external. In other words, some events were within their control (the internal) and other events were beyond their control (the external).

The development of the RAND measurement originated from the Rotter theory of efficacy (Armor et al., 1976), which utilized two questions on a five-point Likert scale. Scoring for this tool was simply summing the scores. The scores, or measure of teacher's sense of efficacy, indicated that a teacher's sense of efficacy had an impact on student motivation, stress level, and teacher retention (Armor et al., 1976). The two questions or items were:

1. When it comes right down to it, a teacher really can't do much because most of a student's motivation and performance depends on his or her home environment.

2. If I try really hard, I can get through to even the most difficult or unmotivated students. (Tschannen-Moran et al., 1998, p. 208).

Other instruments were created utilizing the Rotter Theory to examine the construct of self-efficacy and the connection to teachers. Rose and Medway (1981) created a 28 item forced choice tool, the Teacher Locus of Control (TLC), using the Rotter's locus of control theory and RAND items as a foundation. The TLC scores the result of half of the items describing student success and the remaining half describing student failures. The TLC asks that teachers "assign responsibility of student success/failure by choosing between two competing explanations for the situations described" (Tschannen-Moran et al., 1998, p. 206). Rose and Medway (1981) reported that results of the TLC were significantly related, though weakly, to the RAND items on which the TLC was based.

Other scales were developed in the fashion of the Rotter (1966) and RAND patterns. The Responsibility of Student Achievement (RSA) required the participants to give weight to each of two choices (Guskey, 1981). The Webb Efficacy Scale is a seven item, forced choice scale which forces participants to choose between two statements (Ashton, Olejnik, Crocker, & McAuliffe, 1982). Ashton et al. (1982) was attempting to increase the reliability by removing the social desirability bias. According to the Woolfolk Hoy (2008), the Webb Efficacy scale was an attempt to "extend the measure of teacher efficacy while maintaining a narrow conceptualization of the construct. The Webb Efficacy scale was not widely accepted and does not have research beyond the original work (Woolfolk Hoy, 2008).

Bandura's Measurement of Teacher Efficacy

The second concept from which measurement of efficacy comes is that of Bandura's (1977) concept of perceived self-efficacy, or "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p.3), and social learning theory.   Bandura (1977) stated that people develop what they think will happen in situations in which they act based on life experiences that they have had, labeling this self-efficacy. But for Bandura behavior has a foundation of two factors, one is the outcome expectancy in which they expect certain behaviors to produce certain results and the other is self-efficacy in which they believe in their own ability to perform tasks.

Gibson and Dembo (1984) created the "more extensive and reliable" (Tschannen-Moran et al., 1998, p. 212) Teacher Efficacy Scale (TES) consisting of 30 items on a six point Likert Scale and was most likely in accordance with Bandura's theory of self-efficacy. This scale was able to measure personal teaching efficacy (PTE) and general teaching efficacy (GTE).

The Science Teaching Efficacy Belief Instrument (STEBI) (Riggs & Enochs, 1990) utilized 25 items on a five-point Likert scale. Ashton et al (1982) created the Ashton Vignettes using fifty items describing problem situations including motivation, discipline, or program planning. Bandura's (1977) Teacher Efficacy Scale consists of 30 items on a nine-point scale. Dellinger, Bobbett, Oliver, and Ellen (2008) introduced the American measure of the teachers' self-efficacy beliefs, the Teachers' Efficacy Beliefs System-Self Form (TEBS-Self). This particular assessment measures the teachers' belief in their capabilities to perform particular teaching tasks within the context of their classroom or situation (Dellinger et al., 2008). The Teacher Self-Efficacy instrument was created mainly to identify and study teacher burnout and stress effects on teacher efficacy (Schwarzer & Hallums, 2008).

The Teacher's Sense of Efficacy Scale (TSES), also known as the Ohio State Teacher Efficacy (OSTES), was considered to be more superior to the previous scales that were created prior to 2001 (Tschannen-Moran & Woolfolk Hoy, 2001). Tschannen-Moran et al. (1998) suggested "a model of teacher efficacy suggests that a valid measure of teacher efficacy must assess both personal competence and an analysis of the task in terms of the resources and constraints in particular teaching contexts" (p. 240). Three studies were utilized to create two forms of the instrument, a long form with 24 items and a short form with 12 items (Tschannen-Moran & Woolfolk Hoy, 2001). The original 52-item, 9-point Likert scale was reduced to 32 items during the first study, in which 224 total participants, 146 preservice and 78 inservice teachers, were tested. Not only were participants asked to complete the instrument but were asked to rate each item on a 4-point Likert scale rating the importance of each item for effective teaching. After the examination of factor loading the list was reduced to 32 items to be used in the second study. In the second study a group of 70 preservice teachers, 147 inservice teachers, and 3 of unknown position completed the revised instrument. Three factors emerged from the study when the list was reduced to 18 items. Tschannen-Moran and Woolfolk Hoy (2001) labeled these factors as efficacy for student engagement (8 items), efficacy for instructional strategies (7 items) and efficacy for classroom management (3 items). Alpha reliabilities were determined for these subscales, 0.82 for engagement, 0.81 for instruction, and 0.72 for management. The reliability measurement of 0.95 was conducted on the 18-item list indicating that all the items loaded onto the factor of measuring teaching efficacy. Validity was determined by assessing the correlation of the newly created TSES (or OSTES) with existing instruments (Tschannen-Moran & Woolfolk Hoy, 2001). The results were a positive correlation between the total scores of the TSES and both the RAND items as well as to the PTE and GTE factors of the Gibson and Dembo (1984) measure (Tschannen-Moran & Woolfolk Hoy, 2001).

The third study of Tschannen-Moran and Woolfolk Hoy's (2001) TSES instrument was conducted in attempt to "bolster the weaknesses and enhance the strengths of the nascent instrument" (p. 798). The weakness in the classroom management factor in the 18-item instrument acknowledged by Tschannen-Moran and Woolfolk Hoy was also found by a study conducted by Roberts and Henson (2001) who recommended the removal of this factor. Since classroom management was considered to be important in the scope of teaching by preservice and inservice teachers it was not removed from the scale, rather additional items were added in order to define this factor (Tschannen-Moran & Woolfolk Hoy, 2001). The final scale, consisting of 36 items, was tested on 410 participants who were either preservice or inservice teachers. The three factors identified in the second study were recognized in study three. Items were then reduced to 24 and subscales reliabilities determined to be 0.91 for instruction, 0.90 for management, and 0.87 for engagement. Tschannen-Moran and Woolfolk Hoy (2001) determined the three scales to all have high reliabilities and that a smaller scale would be useable. Examination of the construct validity indicated that the strongest correlations of the TSES, RAND items and the Hoy and Woolfolk (1993) 10-item adapted Gibson and Dembo TES scale were the portions that addressed personal teaching efficacy.

Dellinger (2002) and Dellinger et al. (2008) took efficacy measurement in a slightly different direction by determining that there is a difference in teacher efficacy and teacher self-efficacy beliefs. Teacher self-efficacy beliefs are connected to a specific context such as resource availability. Dellinger et al. (2008) developed the Teachers' Efficacy Beliefs System-Self Form (TEBS-Self) as part of a system of measure to assess efficacy beliefs of teachers. This system consists of measures for teacher efficacy, teacher work group collective efficacy, and teacher faculty collective efficacy (Dellinger, 2001).

TEBS-Self was created through a process of three studies. During Phase 1 of the development the interest was on whether or not the item stems had an effect on self-efficacy ratings. To conduct this study Dellinger et al. (2008) created 3 different forms, two with item stems most often seen in the teacher efficacy instruments created previously and one with non-traditional item stem. Examples of the traditional item stems are phrases such as "I am able to…" or "I can…" and the non-traditional item stems are phrases such as "my belief in my ability to…is…" (Dellinger et al., 2008, p. 756). The 10-point scale was tested in a 15 item list derived from related teaching tasks and listed using one of the three stems. The test was conducted on 434 participants each responding to two of the three forms. From this study it was determined that the BELIEF item was consistent with the "language of the self-efficacy theory" and would remain in the subsequent versions of the TEBS-Self (Dellinger et al., 2008, p. 756).

Phase two of the TEBS-Self development centered on the item development. A framework called PACES was used, as its indicators are associated with effective teaching and learning (Davis, 2000; Ellet, Annunziata, Schiavone, 2002). A 51-item list was generated with situation specific item stems and instructions for the teacher to answer according to their current classroom situation. This item list was then entered into Phase 3 of the development, where the 51 items were rated by 45 professional educators for importance in assessing the beliefs teachers have in their abilities. The final version of TEBS-Self is a 31 item, 4-point Likert scale instrument that specifically targets the beliefs in capabilities with Bandura's theory of self-efficacy used as a theoretical framework. While the creators have evaluated the instrument for reliability, the instrument is in its infancy as compared to other instruments and more research is needed on this instrument.

Teacher Self-Efficacy in Agricultural Science Education

While the measure of teacher efficacy is a relatively new field, the more specific measure of teacher efficacy of the agricultural education teacher is even newer. Rodriquez (1997) conducted one of the first studies of teacher efficacy related to the pre-service, first year, and second year teachers of agricultural education. This study employed a two-factor scale (PTE and GTE) from the Teacher Efficacy Scale (TES) (Gibson & Dembo, 1984). Rodriquez (1997) found that PTE was higher than GTE in pre-service and beginning teachers and, overall the second year teachers had the lowest levels of teacher self-efficacy.

Knobloch (2001), in the first published study of teacher efficacy of agricultural science education teachers, employed the Woolfolk and Hoy (1990) instrument to measure pre-service teachers. This instrument also utilized a two-factor scale (PTE and GTE) in the measurement approach. This study looked primarily at the impact of peer teaching and early field experience on teacher efficacy, which the findings indicated that both certainly influenced the development of teacher efficacy. Knobloch (2001) suggested that students became more effacious due to their observations and experiences from the teaching.

Knobloch and Whittington (2002) followed up the pre-service teacher efficacy study with a study of collective efficacy and teacher efficacy related to supportive principle behaviors. This study utilized the Ohio State Teacher Efficacy Scale (TSES) (Tschannen-Moran & Woolfolk Hoy, 2001). Collective efficacy, which is a group of teachers' shared beliefs in the collaborative abilities to obtain success with their students, was one of the aspects of this study and was measured utilizing Goddard et al.'s (2000) short form to measure collective efficacy. Other areas considered were teaching experience, and quality of the teacher preparatory program. In combination, collective teacher efficacy, teaching experience, and program preparatory quality were determined to influence teacher efficacy (Knobloch & Whittington, 2002).

Knobloch and Whittington (2003b) sought to study the influence of the beginning experience on teacher efficacy development in novice teachers. Specifically the researchers compared the efficacy scores at the first week and tenth week of the school year of student teachers, first, second and third year teachers. To measure the efficacy an instrument was developed using Bandura's (1997) self-efficacy theory and Darling-Hammond's (1999) review of effective teacher characteristics as foundations. Student teachers were the only group that experienced an increase in teacher self-efficacy in the first ten weeks of their student teaching experience. First year teachers experienced the greatest decline in their teacher efficacy over the ten-week time period, however there was virtually no change in teacher efficacy during the same time period for student, second and third year teachers. The largest difference in teacher efficacy occurred between student and first year teachers. This finding led to the suggestion that induction year assistance and support systems be implemented to overcome the feelings of inadequacy during the first year (Knobloch & Whittington, 2003b).

Knobloch and Whittington (2003a) conducted another teacher efficacy study this time using novice first, second, and third year teachers. This study was conducted using pretest and posttest questionnaires in which the teacher efficacy instrument used was the TSES (Tschannen-Moran & Woolfolk Hoy, 2001). Following the pretest the teachers were split into two groups based on their median scores for career commitment, though having the same /similar scores for teacher efficacy. After ten weeks subjects of the two groups were surveyed again and the results indicated that teachers in the group of higher career commitment were more effacious after the first ten weeks of the school year. Also, the other group of teachers, those with lower career commitment, actually had a decline in their efficacy during the ten-week period (Knobloch & Whittington, 2003a).

Another study that utilized the TSES instrument to measure teacher efficacy further looked at the influence of career commitment (Wheeler & Knobloch, 2006). However this study was not limited to exploring the factor of career commitment, rather class size, contract length, and years of teaching experience were also studied. Career commitment was once again shown to influence teacher efficacy. The factors of contract length and teaching experience were determined to be negatively related to teaching efficacy. The negative relationship between years of teaching experience and teacher efficacy conflicted with other studies.

Other studies looked at novice teachers, those teachers in their first year, second year, or third year of teaching in the field of agricultural education. Whittington et al. (2006) studied the influence that experience, gender, and teacher activities had on teacher efficacy. Whittington et al. (2006) found that novice agricultural science education teachers within their first three years of teaching had similar measures of teaching efficacy no matter the level of experience. To conduct this study of first-year, second-year, and third-year agricultural education teachers the researchers utilized TSES to measure teacher efficacy. The researchers looked to see if there were differences in teacher efficacy when characteristics such as stage of development, gender, and teacher activities were taken into consideration. The survey was conducted one time at the end of the school year, as this was a one-shot case study design. Researchers concluded that novice teachers in agricultural education in Ohio were efficacious at the end of the school year. It was also determined that if the student teaching experience was regarded as excellent it did have an impact on teacher efficacy. Another finding was that the number of class preps that were the responsibility of the teacher heavily influenced teacher efficacy.

Agricultural science teachers who have obtained certification via the alternative certification route differ in training from fellow traditionally certified agricultural science education teachers. Traditionally certified agricultural science education teachers have received more instruction in the pedagogical instruction and course content, while alternatively certified agricultural science education teachers possibly miss this preparation in an abridged certification program. Malow-Iroff et al. (2004) determined that alternative certified teachers outside of agriculture education were undecided about their levels of GTE and these teachers score a higher PTE in the areas of instruction and student learning issues. These results were found to be similar in a group of Florida alternatively and traditionally certified agricultural science education teachers (Rocca & Washburn, 2005). Rocca and Washburn concluded that there was no distinguishable variation in perceived teacher efficacy. In a later publication, Rocca and Washburn (2006) suggested no differences occurred in belief of ability to teach between the two groups. The researchers used an adapted version of the TSES (Tschannen-Moran & Woolfolk Hoy, 2001); asking teachers to rate on a 5-point Likert-type scale their beliefs on how well they would rate their performance during certain teaching situations. The population of interest was agriculture teachers with different levels of teaching experiences who had utilized one of two routes to certification. It was recommended that future studies need to concentrate on novice teachers to identify if teachers are equally efficacious based on the route to certification (Rocca & Washburn, 2005, 2006).

Knobloch (2002, 2006) utilized TSES (Tschannen-Moran & Woolfolk Hoy, 2001) on Bandura's (1997) nine-point efficacy scale to measure teacher efficacy. The participants were given a pre-test and post-test. The participants for the student were student teachers at two different institutions. Students at the different institutions were found to be equally efficacious. There were differences identified with perceptions of environmental factors that could influence teacher efficacy, such as the supportive behaviors of principals, cooperating teachers' competency, and the number of class preps experienced by the student teacher. Researchers found that one group of students' perceptions of their teacher preparatory program were related to their teacher efficacy. This could support "that student teachers' attitude may support or inhibit growth in their sense of efficacy" (Knobloch, 2006, p. 44). Students at one institution felt principals in their schools were supportive and that the cooperating teachers were more competent. The researchers connected these perceptions to Bandura's (1997) thoughts on vicarious experiences and verbal persuasion that impact teacher efficacy development. Both groups were found to be efficacious and both reported quite a bit of teaching efficacy. Neither group reported a change in teacher efficacy after their student teaching experiences. This did not support what had been found in other areas of education outside of agricultural science education (Brown & Gibson, 1982; Fortman & Pontius, 2000; Hoy & Woolfolk, 1990).

Roberts et al. (2006) also used the TSES instrument to measure teacher efficacy. This study, conducted on teacher efficacy, found that agricultural science education student teachers started with a measured level of teacher efficacy and that over the course of an eleven week student teaching experience this level dropped and rebounded (Roberts et al., 2006). This study concentrated on the student teachers in agricultural education at different time points in their student teacher experience. The student teaching experience consisted of four weeks on campus and eleven weeks in the classroom. Measurements were taken at four points during the fifteen-week teaching experience. Results indicated the total teacher efficacy varied across the experience.

The researchers also studied the three factors of efficacy for *student engagement, efficacy for instructional strategies, and efficacy for classroom management* (Tschannen-Moran & Woolfolk Hoy, 2001). Results for *efficacy for student engagement* were very similar to the overall teacher efficacy. Earlier it was mentioned that overall teacher efficacy scores varied, in that the scores actually dropped in the middle of the eleven-week experience and increased at the end. The *efficacy for student engagement* mirrored this trend of dropping in the middle of the eleven-week experience. The other factors, *efficacy for instructional strategies* and for *classroom management* also mirrored the trend of a drop during the eleven-week period followed by an increase at the end of experience. However, only the differences for *student engagement* and *instructional strategies* were considered to be significant. The teachers were found to be most efficacious with the *instructional strategies*. The researchers recommended that future studies incorporate measuring the cause of changes in levels of teacher efficacy.

Wolf, Foster, and Birkenholz (2007) utilized another instrument to measure teacher efficacy of agricultural student teachers and their efficacy related to classroom management. To conduct the study Emmer and Hickman's (1991) teacher efficacy scale was used. The instrument had thirty-five items on a six point Likert scale; the scale consisted of sixteen items related to classroom management and discipline efficacy factor, fourteen items related to external influence efficacy, and five items related to personal teaching efficacy. Students were given the questionnaire at the end of their student teaching experience. Collectively the student teacher cohort was moderate in teacher efficacy. The researchers utilized multiple regression analysis to identify leadership development experiences that explain a portion of the variances within the three efficacy constructs of classroom management, external influence and personal teaching efficacy. It found that student teachers perceived that classroom management and discipline and the personal teaching efficacy did in fact influence their students' achievement. The study was unable to discern leadership development experiences as predictors to teacher efficacy.

Harlin, Roberts, Briers, Mowen, and Edgar (2007) used the TSES (Tschannen-Moran & Woolfolk Hoy, 2001) to determine if changes occurred in the teacher efficacy of student teachers over the course of their student teaching experience. They also wanted to observe if similar trends would occur at other institutions. The study was based on the Bandura's (1997) theory of self-efficacy and Kolb's (1984) theory of experiential learning. This work was in many ways a replication of earlier work of Roberts et al. (2006). Data was collected at four points related to the fifteen-week student teaching experience. Findings were consistent with Roberts et al. (2006) and Knobloch (2002); the teacher efficacy started high, fell to lowest at middle of eleven-week field experience and rose at the end of the experience. The researchers suggested interventions during the low teacher efficacy point to help increase teacher efficacy.

Roberts, Harlin, and Briers (2007) studied the impact of individual personality on teacher efficacy development. TSES (Tschannen-Moran & Woolfolk Hoy, 2001) was used to measure overall teacher efficacy and the three constructs of student engagement, classroom management, and instructional strategies. The Meyers-Briggs Type Indicator (MBTI) Form M® was used to determine personality type of the teachers. The target population was cooperating teachers, which are teachers who have a minimum of three years of experience teaching. The researchers stressed that these results should be generalized beyond this study population because this was a convenience sample. There were findings of "quite a bit" of teaching efficacy in the three constructs and in the overall teaching efficacy. These findings follow reasoning as the cooperating teachers have three years of experience. The study revealed that teachers with a personality characteristic of Extroversion (E) were more effacious in all three efficacy constructs and overall teacher efficacy. Those with the characteristic of Judging (J) were positively related to the classroom management construct, while those with the Sensing (S) characteristic were negatively related to student engagement. The researchers suggested repeating this study with similar groups to allow for generalization.

Edgar, Roberts and Murphy (2008, 2009) examined the impact of introducing structured communication between cooperating teachers and student teachers on the development of teacher efficacy of the student teachers. The structured communication in this study was a formalized feedback form that was utilized to rate student teachers each week during the eleven-week classroom experience. Teacher efficacy was measure at three points using the TSES (Tschannen-Moran & Woolfolk Hoy, 2001). It was determined that teaching efficacy actually declined. Edgar et al. (2008, 2009) felt that "self-perception can be lowered if feedback is overly harsh rather than constructive and focused on specific performance criteria" (p. 11) which lead to a suggestion that the structured communications need to be monitored. It was possible that those receiving feedback "more discriminately judged their abilities through involvement with the treatment" (p. 11).

Wolf, Foster, and Birkenholz (2008) looked at the relationship of agriculture education teacher candidates' teacher efficacy and their professional experiences and perception of preparation. The researchers used TSES (Tschannen-Moran & Woolfolk Hoy, 2001) with questions added to assess professional activities using Borich (1980) needs assessment model to identify areas where teachers required in-service education. This was one of the first studies to offer an alternative way to measure teacher efficacy because the researchers felt it was more specific to agricultural science educators. The study determined that there were high levels of teacher self-efficacy at the end of the student teaching experience, which mirrored past studies (Knobloch, 2002; Roberts et al., 2006). The teacher candidates were found to be most effacious in classroom management, slightly less effacious in instructional strategies and least effacious in student engagement. The findings related to the perception were identical to findings related to teacher efficacy; leading researchers to conclude that preparation of agricultural education teacher candidates somewhat coincided with teacher efficacy development.

Wolf et al. (2008) also examined the professional activities during internship. These were categorized into sources of efficacy based on Bandura's (1994) categories of mastery experiences, physiological and emotional arousal, vicarious experiences, and social persuasion. The findings showed the most impact, or positive relationship, was when candidates observed a first year teacher thus having a vicarious experience. Researchers felt the candidates could relate to the novice teachers and were not intimidated by the experience held by teachers who had been teaching longer. There was also a strong negative relationship between efficacy domain of classroom management and the number of courses a candidate was involved in teaching. Researchers suggested they were teaching too many courses. Bandura (1986) suggested that self-efficacy is built when an individual is successful at a task. The overload of courses may be preventing the candidates from experiencing success.

Burris, McLaughlin, Brashears, and Fraze (2008) compared the general teacher efficacy (GTE), personal teacher efficacy (PTE), and content efficacy of first year and fifth year teachers. The use of first year versus fifth year was based on the Teacher Career Cycle Model (Huberman, 1989), which indicates differences in these teachers. A

Woolfolk and Hoy (1990) modified version of the Teacher Efficacy Scale (Gibson & Dembo, 1984), which used sixteen items with four more items added to explore the adequacy of the teachers' preservice program. The content knowledge was measured using a researcher created fourteen items in which a teacher was asked to rate their confidence in the ability to teach technical competencies. The content domains considered for this research were agribusiness and economics, plant and soil science, animal science, agricultural mechanics and technology and natural resources and environmental sciences. The findings indicated that PTE was higher than GTE in both groups of teachers. The fifth year teacher had a higher sense of PTE and GTE than the first year teacher. Similar results were found in the content efficacy. In the specific content areas, the first years were found to more effacious in animal science and least effacious in agricultural mechanics, while the fifth year teachers were found to be more effacious in animal science and least effacious in natural resources and environmental science.

Robert, Harlin and Briers (2008) explored the impact of placing two student teachers in the same school at the same time on teacher efficacy development. Some schools hosted unpaired student teachers and other schools hosted paired student teachers. This study was guided by Bandura's (1997) Model of Triadic Reciprocality and self-efficacy theory. Data was collected at three points using TSES (Tschannen-Moran & Woolfolk Hoy, 2001) to measure teacher efficacy. It was concluded that student teachers who begin the field experience effacious about teaching ability, become less effacious toward the middle of the experience, and rebound to higher levels of efficacy at the end of the experience. This finding was similar to previous results found by Roberts et al.

(2006). This study also looked at the impact of peer modeling, and the researchers found no difference in teaching efficacy occurring in paired student teachers as compared to the unpaired student teachers. This conflicts with Bandura's (1997) theory, which includes the positive influence of peer models.

The Blackburn and Robinson (2008) study used a descriptive-correlational design to describe the current levels of teacher efficacy and job satisfaction and to determine if there is a connection between the two. The population for this study was agricultural science education teachers who have taught six year or less, also called early career teachers. The groups were split into group 1 of 1 to 2 years, group 2 of 3 to 4 years, and group 3 of 5 to 6 years. TSES (Tschannen-Moran & Woolfolk Hoy, 2001) was used to measure total teacher efficacy and efficacy within the three constructs of this instrument. The findings indicated that these early career teachers were effacious and satisfied with teaching. They were most effacious at classroom management and least effacious at student engagement. The researchers determined that "a positive and substantial relationship exists between overall job satisfaction and the teacher self-efficacy constructs of student engagement and classroom management" (Blackburn & Robinson, 2008, p. 8) for first year and second year teachers.

Another study utilized the TSES (Tschannen-Moran & Woolfolk Hoy, 2001) to perform a longitudinal exam of teaching self-efficacy of preservice teachers (Stripling, Ricketts, Robert, and Harlin, 2008). This descriptive study looked at the three constructs of the TSES as well. It was determined that overall teaching efficacy rose at each of three collection points for overall score and the scores three constructs of the TSES.

Preservice teachers were more effacious in the instructional strategies and classroom management and least effacious in student engagement.

In an attempt to create a more specific measure, Duncan and Ricketts (2008) created a modified version of a Borich (1980) Needs Assessment model. The purpose was to determine if agricultural education teachers' perceived levels of efficacy differ as they relate to managing the total program of agricultural education for both traditionally and alternatively certified. The constructs of the measurement tool included technical agriculture content, FFA/Leadership Development/SAE, teaching and learning, and program management. Traditional certified teachers were most effacious in their program management abilities and least in technical agricultural content knowledge. The alternatively certified were most effacious in the pedagogical strategies and least effacious in technical agricultural content knowledge.

A vast majority of the studies involving the teacher efficacy of agricultural education teachers and their teacher efficacy used the TSES (Tschannen-Moran & Woolfolk Hoy, 2001). While this instrument has been used by many in varying areas of education mostly for its generality, there exists a need for a specific instrument of measure for agricultural educators. The following chapter will put forth the argument for the need for a new specific agricultural education teacher efficacy instrument and also describe the development of the instrument.

Summary

Teacher efficacy has been successfully measured with one of a number of existing instruments. More specifically, teacher efficacy has been measured in agricultural science education teachers. However the instruments used to measure teacher efficacy, while good instruments to measure a general population regardless of educational discipline, do not take into consideration the interesting and unique dual role of an agricultural educator. The following chapter will address the need of a more specific measure of agricultural science teacher self-efficacy. For now the understanding is that teacher efficacy has been measured but it has been done so using instruments that lack specificity.

CHAPTER III

METHODOLOGY

The purpose of this study was to investigate the extent of teacher self-efficacy beliefs of agricultural science education teachers. The questions that guided this study were:

1. What are the perceived teacher self-efficacy beliefs of agricultural science education teachers?
2. What are the differences occurring in the perceived teacher self-efficacy beliefs of alternatively certified agricultural science education teachers as compared to the traditionally certified?
3. To what extent do personal and situational characteristics impact the perceived teacher self-efficacy beliefs of agricultural science education teachers?
4. To what extent is the relationship of personal and situational characteristics and self-efficacy beliefs to designated outcomes of innovative teaching, job satisfaction, program impacts, and teacher retention?

This chapter is organized into the seven sections describing this study's framework, design of study, instrumentation, sample selection, data collection, data analysis, and limitations.

Framework

To develop the framework for this study of teacher efficacy in agricultural science education, many theories of self-efficacy and teacher self-efficacy were reviewed (Armor et al., 1976; Bandura, 1977, 1993; Collins, 1982; Goddard et al., 2004; Rotter 1966). Bandura's model for self-efficacy and teacher efficacy became the foundation for this research as this theory has been used as basis for some of the instrumentation used by previous researchers. Bandura (1986) stated that self-efficacy was the belief in one's capabilities to generate a particular or desired outcome. These self-efficacy beliefs can be a major influence on human motivation and behavior. This self-efficacy belief impacts the events of the individuals' lives by affecting how they feel, think, motivate themselves and behave (Bandura, 1994). The stronger the individuals self-efficacy the more enhanced their accomplishments and well-being.

To be more specific, this study explored teacher self-efficacy beliefs or teacher efficacy in agricultural science education teachers who utilized a traditional route or an alternative route to certification. Teacher efficacy was defined in early studies as the belief of the teacher's own capabilities to produce the desired outcomes in student engagement and learning (Armor et al., 1976; Bandura, 1977). This definition speaks to both how important a teacher's beliefs in their capabilities are to their careers as teachers and also how important it is to possess the capabilities. It was Bandura's (1977) work that related teacher efficacy to a type of self-efficacy, which was defined as a person's belief about their capabilities to perform or achieve at a particular level. Bandura (1997) furthered defined efficacy to include what the beliefs influenced ranging from the amount of effort a person put forth to how a person handled stressful situations.

For the purpose of this study, teacher self-efficacy in agricultural science education teachers was defined as the belief these individuals have in their capabilities to "organize and execute a course of action" (Bandura, 1986, p. 391) needed to achieve goals pertaining to their role as an agricultural science educator. An agricultural science education teacher has roles in the formal learning classroom setting and informal learning setting of the FFA/SAE, thus placing them in the position of having dual roles as an educator and advisor. Given this foundation, the following constructs were then identified: (a) teaching efficacy beliefs of management in the formal classroom; (b) teaching efficacy beliefs of instructional strategies in the formal classroom; (c) teaching efficacy beliefs of student engagement in the formal classroom; (d) teaching efficacy beliefs of project management in the informal learning venue; (e) teaching efficacy beliefs of instructional strategies in the informal learning venue; and (f) teaching efficacy beliefs of student engagement in the informal learning venue. Table 3.1 provides the definition of these constructs. These constructs have foundation in the work done by Tschannen-Moran and Woolfolk Hoy (2001) in a more general setting. Their teacher efficacy studies gave rise to the three constructs: (a) teacher efficacy of classroom management; (b) teacher efficacy for student engagement; and (c) teacher efficacy of instructional strategies.

These six constructs served as the central focus for the study. This study attempted to understand the teacher efficacy beliefs and what serves as predictors for the strength of those beliefs. In the logic model for this study I predicted there are two types of characteristics, personal and situational, that influence teacher self-efficacy belief development, thus impacting the outcomes. Figure 3.1 provides the rendering of this model. A review of literature and conversations with experts provided the listing of individual characteristics of each type as well as a list of possible outcomes that are influenced by a teacher's self-efficacy belief. While many outcomes were identified only five were chosen to be part of this study. These predictor variables, personal and situational, and outcome variables will be discussed in greater detail later.

Table 3.1

Definition of Teacher Self-Efficacy Constructs

Construct Name	Definition
Teaching Efficacy Beliefs of Management in the Formal Classroom	The teacher's belief in their capabilities to effectively supervise the classroom in the structured setting of formal learning.
Teaching Efficacy Beliefs for Student Engagement in the Formal Classroom	The teacher's belief in their capabilities to effectively capture the interest of the students in the structured setting of formal learning.
Teaching Efficacy Beliefs for Instructional Strategies in the Formal Classroom	The teacher's belief in their capabilities to effectively utilize tactics, methods, and materials to assist students in achieving an educational goal in the structured setting of formal learning.
Teaching Efficacy Beliefs of Project Management in the Informal Learning Venue	The teacher's belief in their capabilities to effectively supervise the non-classroom activities such as FFA/SAE (informal learning venues).
Teaching Efficacy Beliefs of Student Engagement in the Informal Learning Venue	The teacher's belief in their capabilities to effectively capture the interest and participation of the students in the non-classroom activities such as FFA/SAE (informal learning venues).
Teaching Efficacy Beliefs of Instructional Strategies in the Informal Learning Venue	The teacher's belief in their capabilities to effectively utilize tactics, methods, and materials to assist students in achieving an educational goal in non-classroom activities such as FFA/SAE (informal learning venues).

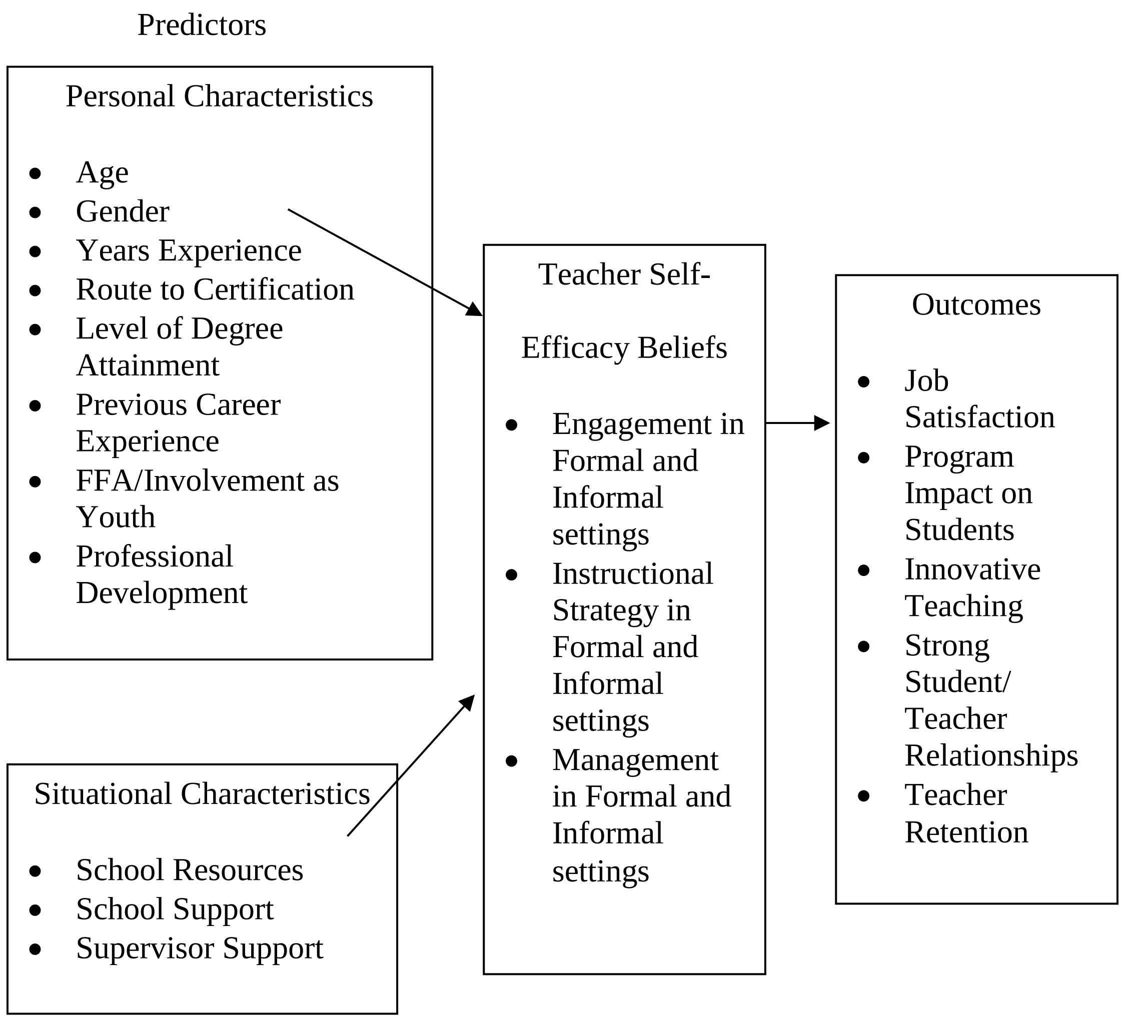

Figure 3.1 Conceptual Model for Study

While Figure 3.1 is a representation of the study as a whole, the last three questions guiding this study can be represented by breaking down the whole representation into its singular parts. Figure 3.2 is an illustration of the predictors of personal and situational characteristics impact on the development of the perceived teacher self-efficacy beliefs. These predictors, personal and situational characteristics, will be discussed later in greater detail.

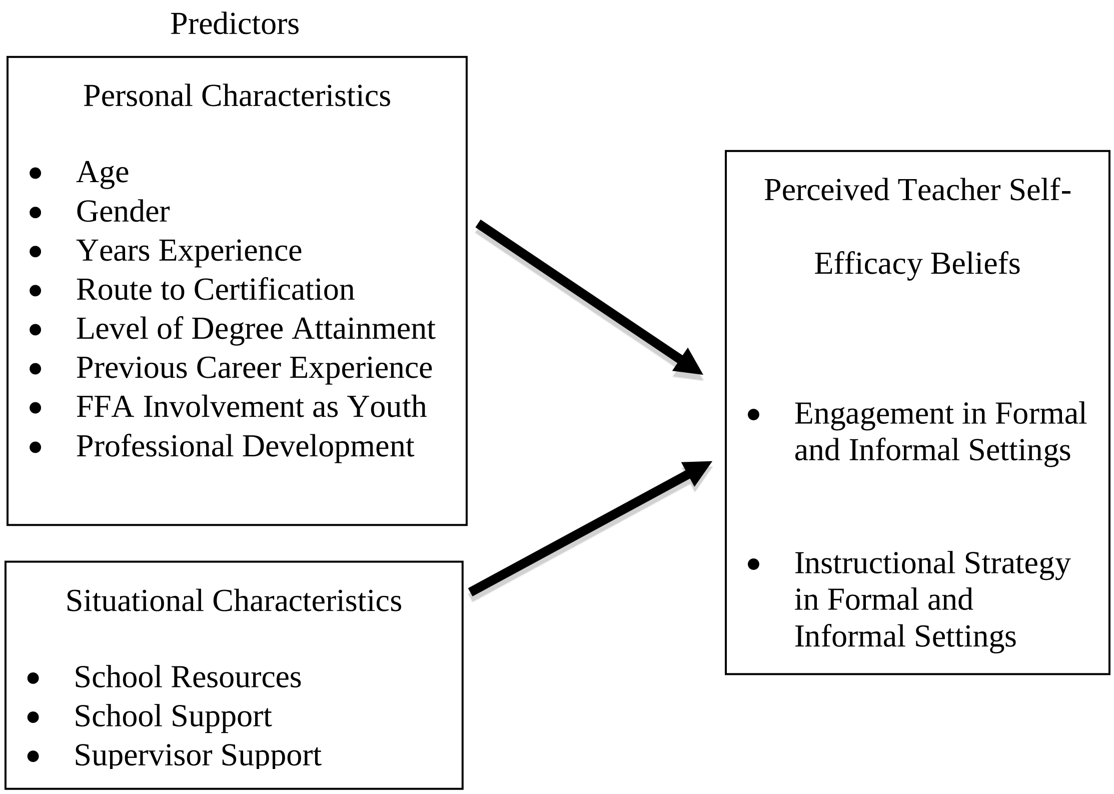

Figure 3.2 Model of Predictors of Perceived Teacher Self-Efficacy Beliefs

Route to certification and its impact on perceived teacher self-efficacy beliefs of an agricultural education teacher has been considered in other studies (Duncan & Ricketts, 2006; Rocca & Washburn, 2006). This study also explores this relationship while utilizing a more specific measure of perceived teacher self-efficacy beliefs. Figure 3.3 is a representation of the relationship of route to certification to the development of teacher efficacy. Referring back to Bandura (1994), one could predict that differences in mastery experiences should have an impact on the development of perceived teacher self-efficacy. Teachers on different routes would have different mastery experiences, thus leading to a prediction that there would be differing results in their teacher self-efficacy.

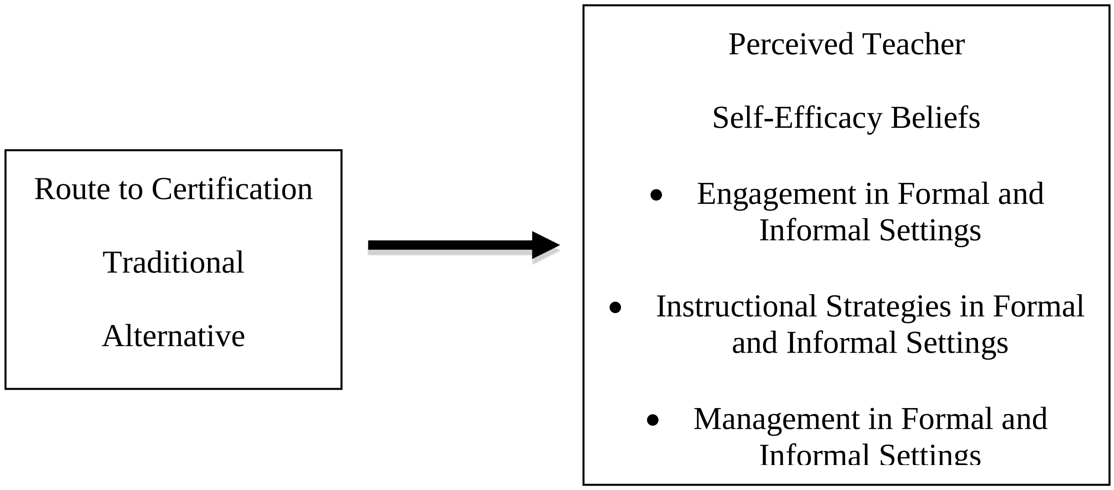

Figure 3.3 Model of the Relationship between Certification and Teacher Self-Efficacy

Figure 3.4 depicts the relationship between the personal and situational characteristics, perceived teacher self-efficacy beliefs and outcomes such as job satisfaction. Personal and situational characteristics are considered to influence the perceived teacher self-efficacy beliefs and then these beliefs impacting the outcomes such as job satisfaction and teacher retention. Some studies have found that agricultural science education teachers who were highly committed to their career were more efficacious (Knobloch & Whittington, 2003a).

Figure 3.1 detailed above is a total picture of the entire study, with recognized influencers of perceived teacher self-efficacy. Figure 3.4 addresses only those entities that result in designated outcomes such as job satisfaction. Table 3.2 provides a detailed explanation of the outcomes and the definitions for this study.

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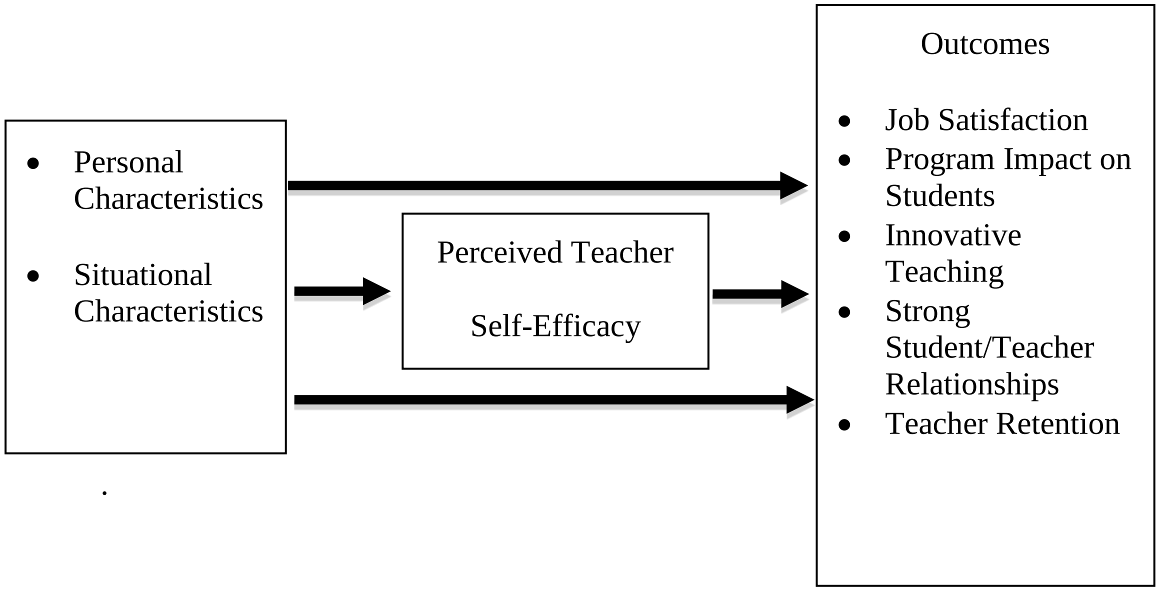

Figure 3.4 Model of Relationship of Predictors and Perceived Teacher Self-Efficacy to Outcomes

Table 3.2

Outcomes and Definitions

Outcomes	Definitions
Job Satisfaction	Fulfillment in the day-to-day work related activities.
Program Impact on Students	Self-perceived measure of influence the teacher has on student achievement and motivation
Innovative Teaching	Use of new and creative teaching methods to motivate and instruct students.
Strong Teacher/Student Relationships	Academic relationship in which a teacher has an impact on student personal and academic growth.
Teacher Retention	Retainment of the teacher to the school of employment (or the profession of teaching).

These outcomes are often associated with work done in teacher efficacy. Studies conducted in other areas of education beyond that of agricultural education have found that self-efficacy does influence teacher motivation and performance (Bandura, 1977; Tschannen-Moran & Woolfolk Hoy, 2001; Tschannen-Moran et al. 1998; Woolfolk & Hoy, 1990). Job satisfaction has been shown to have a relationship with higher levels of job performance (Judge, Thorenson, Bono, & Patton, 2001). By this, a highly effacious teacher is one who is high performing and highly satisfied in their job. Coldarci (1992) found that an effacious teacher had a strong commitment to their profession.

Dissatisfaction with the job has been associated with teachers who are less committed and more likely to leave the profession (Evans, 2001; Ingersoll, 2001). Highly effacious teachers have an impact on student achievement and motivation (Caprara, Barbaranelli, Stecca, & Malone, 2006). Woolfolk Hoy and Davis (2005) found that teachers who were effacious in the areas of instruction, management, and teacher/student relationships had more cognitive and emotional resources accessible to encourage and motivate student achievement. Effacious teachers are more likely to prompt students to continually complete challenges and seek out a deeper understanding of the instructional material utilized. Skaalvik and Skaalvik (2007) determined that a teacher's self-efficacy influences their behaviors as a teacher that complimented the work done by Tschannen-Moran and Woolfolk Hoy (2001). Returning to Bandura's (1997) theories, self-efficacy, from which teacher self-efficacy is derived, is an important influence on human achievement in a myriad of settings such as athletics, education, and business.

Design of the Study

This study utilized a descriptive design to answer the research questions. Kerlinger (1986) stated that the focus of this type of research was to explore the facts about people, opinions, and attitudes. A better definition of descriptive design is that "its purpose is to systematically describe the facts and characteristics of a given phenomenon, population, or area of interest (Merriam & Simpson, 2000, p. 61).

A quantitative survey method was used for the following reasons. First of all this type of design uses a systematic scientific investigation of data and relationships to generate conclusions. A quantitative survey was used to explore the factors related to teacher self-efficacy beliefs. For example, the relationship between the routes to certification an individual pursues and the development of their teacher self-efficacy beliefs can be studied. Secondly, the quantitative method allows for the minimizing of subjectivity of judgment therefore allowing for more objective conclusions (Kealey & Protheroe, 1996; Matveev, 2002). Finally, the quantitative method provides an opportunity to achieve high levels of reliability of gathered data due to the mass survey (Balsely, 1970).

Instrumentation

This work began by considering the use of other instruments to measure teacher efficacy. Among those considered were the TSES (Tschannen-Moran & Woolfolk, 2001), and two scales which attempted to become more specific to an agricultural educator (Duncan & Ricketts, 2006; Wolf, 2008). Previous studies (Blackburn & Robinson, 2008; Harlin et al., 2007; Roberts et al., 2007; Roberts et al., 2006; Rocca & Washburn, 2006) of teacher efficacy beliefs of agricultural science education teachers have used the TSES (Tschannen-Moran & Woolfolk Hoy, 2001). However this instrument was designed to be very general. The TSES "assesses a broad range of capabilities that teachers consider important to good teaching, without being so specific as to render it useless for comparisons of teachers across contexts, levels, and subjects…" (Tschannen-Moran & Woolfolk Hoy, 2001, p. 801). Specifically, this general instrument allows for comparisons of teacher efficacy no matter the subject area. However, Bandura (2006) suggested that the general measure was limited in its scope and that a more specific instrument of measure had value.

Duncan and Ricketts (2006) utilized a Borich (1980) Needs Assessment Tool to develop a more specific instrument of measure that would capture the area unique to agricultural science educators. In this instrument, focusing the measurement of the areas of technical agriculture content, FFA/leadership development/SAE, teaching and learning, and program management developed the specificity to agricultural science teachers. Another study utilized more specific measures by creating domains of teacher self-efficacy in the classroom, teacher self-efficacy in FFA, and teacher self-efficacy in SAE (Wolf, 2008).

These last two studies moved away from the three domain or constructs concept of the TSES, which uses specific constructs of efficacy for classroom management, efficacy for instructional strategies, and efficacy for student engagement (Tschannen-Moran & Woolfolk Hoy, 2001). While this strategy works for the science or math teachers, it is missing a component found in the role of an agricultural science education teacher. Agricultural science education teachers exist in two worlds educationally. One world is the very traditional setting in which formal classroom education and traditional teacher-student relationships are formed. The other world is that of a non-traditional setting involving the coaching and advising associated with FFA and SAE in an informal learning environment. This type of learning context provides an opportunity for informal learning experiences (Ramsey & Edward, 2004).

An appropriate instrument to measure teacher efficacy of the specific agricultural science education teacher population who exist in two learning environments could not be found. Rather, a researcher-designed instrument that incorporates aspects of previous instruments of measure was developed for the purpose of measuring the self-efficacy of agriscience teachers. The instrument utilizes a combination of the three factors of efficacy for classroom management, instructional strategies, and student engagement from the Tschannen-Moran and Woolfolk Hoy (2001) study with the split learning environment of formal and informal education. The development of the instrument followed a nine-step process including (a) concept clarification, (b) identifying items to measure perceived teacher self-efficacy, (c) construction of response scale, (d) identifying predictor variables, (e) identifying outcome variables, (f) identifying demographic information, (g) expert review of survey instrument, (h) critique session, and (i) pilot study. Table 3.3 outlines the steps and following is a discussion of these steps.

Developing a Measure of Teacher Self-Efficacy

Steps taken to create an instrument specific for the measure of teacher efficacy in agricultural education teachers include concept clarification, identification of the items to be used, construction of a response scale, and identification of predictor variables, personal characteristic variables, situational characteristic variables, outcome variables, and demographic information. Each step will be discusses in the subsequent sections.

Table 3.3

Study Survey Instrument Development Process

Developing a Measure of Perceived Teacher Self-Efficacy
Concept Clarification
Identifying Items to Measure Perceived Teacher Self-Efficacy
Construction of Response Scale
Selecting Predictor and Outcome Variables
Identifying Predictor Variables
Identifying Outcome Variables
Identifying Demographic Information
Additional Steps in Instrument Development
Expert Review of Survey Instrument
Pilot Study

Concept clarification. To design an instrument to measure teacher efficacy with specificity for agricultural science education teachers, the concept must be clarified. This concept of teacher self-efficacy for agricultural science education teachers encompass their complete role as teacher and FFA/SAE advisor. Constructs, which were mentioned in a previous section, were developed via the path of literature research and discussions with field experts.

Initially the review of literature identified numerous different ways in which teacher efficacy has been measured in other disciplines. Teacher efficacy was divided into two subsections of general teaching efficacy (GTE) and personal teaching efficacy (PTE) (Tschannen-Moran & Woolfolk Hoy, 2001). The debate by researchers about the meaning of GTE has resulted in the use of many labels (Tschannen-Moran et al., 1998). This subsection of teaching efficacy has been described as the "external influences" (Emmer & Hickman, 1990) or "outcome expectancy" (Riggs & Enochs, 1990). The GTE is related to factors which exist beyond the individual capabilities of the teacher, but which teachers feel or believe they can influence, such as, the value placed on education in the home (Tschannen-Moran & Woolfolk Hoy, 2001). Since this subsection of teaching efficacy tends to be unreliable in its measure (Henson, Kogan, & Vacha-Haase, 2001), the other construct of PTE was determined to be the foundation on which this study's concept was based.

The PTE is more specific to individuals and their beliefs about what they as teachers can achieve (Tschannen-Moran & Woolfolk Hoy, 2001). It is this measure of teacher efficacy that has been shown by researchers to have an impact on student achievement (Armor et al., 1976; Berman et al., 1977). This PTE can be further divided into the three factors or constructs of efficacy of classroom management, instructional strategies, and student engagement used by Tschannen-Moran and Woolfolk Hoy (2001).

While these three factors emerged from the Tschannen-Moran and Woolfolk Hoy (2001) study and were utilized in the instrumentation, it lacks specificity for the uniqueness that is an agricultural science educator. Agricultural science education teachers fulfill a dual role as the traditional classroom teacher and then as the advisor/coach/mentor for non-traditional classroom activities such as FFA and SAE. Previous instruments used to measure teaching efficacy did not take into account the fact that these teachers operate in both a formal learning environment and an informal learning environment. I decided to continue down a path that would incorporate this unique situation into the instrument. Thus, the constructs incorporated the formal and informal learning environments. Earlier, Table 3.1 defined the predicted constructs: (a) teaching efficacy beliefs of management in the formal classroom; (b) teaching efficacy beliefs of instructional strategies in the formal classroom; (c) teaching efficacy beliefs of student engagement in the formal classroom; (d) teaching efficacy beliefs of project management in the informal learning venue; (e) teaching efficacy beliefs of instructional strategies in the informal learning venue; and (f) teaching efficacy beliefs of student engagement in the informal learning venue.

Identifying items to measure teacher self-efficacy. Table 3.4 outlines the instrument development and validation process. This instrument was designed to measure the three areas of self-efficacy beliefs in engagement, instructional strategies, and management found in the formal and informal settings of the agricultural education teacher. This instrument was also used to evaluate the impact of the previous career experience on the development of teacher efficacy in those utilizing an alternative certification route. The constructs of efficacy of engagement, efficacy of instructional strategies, and efficacy management in the formal setting and informal setting were the fundamental constructs for the design of the instrumentation.

In crafting the instrument, prototype items were written by the investigator based on wide reading in teacher efficacy and researcher's own experience with agricultural science education teachers in the field. Items were taken from instruments used in other areas of education and items were created based on research into the standards and goals that agricultural education teachers recognize for their career. A list of 131 items, was refined to a list of 64 items and then were matched with the existing constructs. Seventy items were removed due to similarity and many were identified as duplications of statements. In order to verify these are the most appropriate items, the list of prototype items were presented to an expert critique panel to assist in consolidating the list of items.

Table 3.4

Overview of Instrument Development and Validation Process

Activities	Methods	Results
1. Building Initial Item Pool	a. Literature Review	89 items
	b. Interview of Content Expert	42 items
2. Refining Item Pool	Researcher conducted	64 items
3. Content Validity	Expert Survey	64 items
4. Pilot Survey	Questionnaire (Internet)	44 items

Construction of response scale. Past instruments, such as the TSES (Tschannen-Moran & Woolfolk Hoy, 2001) utilize a nine point Likert Scale. This type of response scale and other formats were considered. Due the possible length of instrument and I finally determined that five point Likert scale ranging from poor to excellent was the best scale for this study. Categories of the scale include poor, fair, good, very good and excellent. Individuals were asked to rate how well they do categories of items in order to capture their self-efficacy belief.

Selecting Predictor and Outcome Variables

The next step was related to the selection of predictor and outcome variables as related to perceived teacher self-efficacy. Previous research was utilized to finalize the selection of each type of variable. Predictor variables were divided into two types based upon the types of efficacy, PTE and GTE. This resulted in the creation of personal predictor variables and situational variables. Outcomes are discussed in relation to the work previously done by other researchers who have identified these particular outcomes as impacted by perceived teacher self-efficacy.

Identifying predictor variables. Once the constructs were identified, the next step was the selection of predictor variables that influence the efficacy-belief development of agricultural science education teachers. Variables were identified for both personal characteristics and situational characteristics via literature research and discussions with experts in the field. Situational characteristics represent those things that are beyond the teacher's control. Table 3.5 lists predictor and situational variables and the rationale for the choice of these predictors in this study.

Personal characteristic variables. Based on a review of the literature, discussions with agricultural science educators, and my personal experience, the following personal characteristics were selected as personal characteristic variables: age, gender, race/ethnicity, years of teaching experience, route to certification, level of degree attained, previous career experience, and FFA/SAE involvement as a youth.

Age was selected in relation to Bandura's (1994) thoughts on the impact that mastery experiences has on efficacy development. It is logical to think a person older in age has had more opportunity to be influenced by their experiences. Variables pertaining to years of teaching experience, route to certification, and level of degree attainment also fit within those variables that predict efficacy development based on mastery experiences.

Table 3.5

Predictor Variables and Rationale

Type	Predictor	Rationale
Personal	Age	Age and maturity bring forth an opportunity to have many mastery experiences.
	Gender	Agriculture education is mainly male, thus social persuasion and social models may not provide a nurturing atmosphere for females.
	Years of Teaching Experience	The more experienced teacher has more mastery experiences for the foundation of stronger efficacy development.
	Route to Certification	Shortened training experiences could impact efficacy development.
	Level of Degree Attainment	Higher education exposes teachers to additional knowledge and mastery experiences.
	Previous Career Experience	These experiences provide a set of skills and experiences that could impact efficacy development.
	FFA/SAE Involvement as Youth	Experiences with the programs as a youth provide knowledge and familiarity to impact efficacy development.
	Professional Development	Continued education increases opportunity for mastery experiences.
Situational	School Resources	Typically beyond teacher control but can be an impact of social persuasion.
	School Support	Colleague support can impact efficacy development via social persuasion.
	Supervisor Support	Mentor support and colleague support can impact efficacy development via social model and social persuasion.

As for the selection of gender, there have been studies indicating that women who were agricultural science education teachers with high self-efficacy were able to overcome gender bias in their career (Kelsey, 2007). Bandura (1994) suggested, "it requires a strong sense of efficacy to remain task oriented in the face of pressing situational demands, failures, and setbacks that have significant repercussions" (p.73).

Situation characteristic variables. Tschannen-Moran and Woolfolk Hoy (2007) found that novice teachers' self-efficacy beliefs were impacted by teaching resources made available to them more so than the verbal persuasion or encouragement provided by community and parents of the students. The experienced or career teachers' self-efficacy beliefs were found to be influenced by the social persuasion provided by community and parental support. Burris et al. (2006) determined that the support is not dependent on whether the mentor is in the same school district or a different school district, or whether the mentor is even from an agricultural field, the teacher was still able to receive positive support. It may be that simply knowing the support is available helped to build the confidence of teachers (Odell & Ferraro, 1992).

Identifying outcome variables. Teacher efficacy has been found to have outcomes related to student achievement (Anderson et al., 1988; Armor et al., 1976; Ashton & Webb, 1986; Moore & Esselman, 1992; Ross, 1994). Outcomes are not just related to the students but there have been studies indicating the positive impact of a high teacher efficacy on the teacher. Outcome variables represent those factors that are impacted by a teacher's self-efficacy development. These factors, job satisfaction, program impact on students, use of innovative teaching methods, building of strong teacher/student relationships, and teacher retention have been studied in relation to teacher efficacy. As for the outcomes from high teacher efficacy, Goddard et al. (2004) found efficacy to be an indicator of productive teaching practices. Teachers with a high sense of teaching efficacy have been found to utilize new ideas in the classrooms to meet student needs as related to learning (Berman et al., 1977; Guskey, 1988; Smylie, 1988; Stein & Wang, 1988). Teachers with a high sense of efficacy are often more competent at planning and organization than those with a low sense of teaching efficacy (Allinder, 1994). High teacher efficacy has been related to teacher competencies such as ability to handle experiences that would otherwise hinder teachers with low teacher efficacy. Those teachers with high teacher efficacy have been found to handle stress effectively (Parkay, Greenword, Olejnik, & Proller, 1988), to remain within the field (Glickman & Tamashiro, 1982), and to have more successful students (Ashton & Webb, 1986).

Allinder (1994) found that teachers with a higher sense of teaching efficacy are more passionate about teaching. Gibson and Dembo (1984) determined that teachers with high teaching efficacy were less likely to be critical with students who were struggling, while Allinder (1994) found that these types of teachers were better able to handle students who made mistakes. Other studies have shown that teachers with a higher sense of teaching efficacy are more student- centered (Czerniak and Schriver, 1994; Enochs, Scharmann, & Riggs, 1995). Commitment to teaching (Coladarci, 1992; Evans & Tribble, 1986), job satisfaction (Lee, Dedrick, & Smith, 1991), trust (Da Costa & Riordan, 1996), and openness (DeForest & Hughes, 1992), and higher teacher retention (Burley, Hall, Villeme, & Brockmeier, 1991; Glickman & Tamashiro, 1982) has been linked to high teacher efficacy. Teacher efficacy impacts not only the student in the classroom but also the teacher as well. So for this study, the outcome variables used are job satisfaction, program impact on students, and teacher retention.

Identifying demographics information. This questionnaire included the collection of data pertaining to the age, education level, years of teaching experience, route to certification, if the individual had experience with FFA or SAE in their youth, and determination of whether this career path is a second career. Second career refers to the path the individual used to obtain certification. Information will also be gathered related to any previous career experience that the individual might have. Also information regarding race and ethnicity were gathered.

Race/ethnicity of the agricultural science education teacher may have importance in that white, non-Hispanic teachers were reported to make up 93.6% of teachers (Camp et al., 2002). The National FFA (2010) organization reports that their membership of students is 77% Caucasian, 17% Hispanic, and only 4% African American, therefore providing a possible impact via the social persuasion aspect of efficacy development described by Bandura (1997) in a teacher from a minority group.

Additional Steps in Instrument Development

There were additional steps needed to finalize the instrument. Mentioned earlier was an expert review. A pilot study was also conducted for the finalization of the instrument development.

Expert review of survey instrument. An expert review of the survey instrument was conducted utilizing a group of experts in the area of agricultural education. This step in finalization of the instrument was conducted to ensure that the items in the instrument did in fact capture the efficacy of agricultural education teachers. A group of ten experts in the area of agricultural science teacher education were identified via literature review and discussions with experts in the area of teacher efficacy and agricultural education. Ten experts, who taught at the university/collegiate level of agricultural education, were invited to participate in the review. These experts were asked to assess the clarity of the items in the instrument for the intended population, determine if any items were missing, and ascertain if any of the current items should be removed from the instrument (Appendix A). Experts were asked to rate the importance of items on a 5-point Likert scale with not important, slightly important, moderately important, very important, and extremely important. See Appendix B for letters of communication with experts.

Five of the experts accepted the invitation to participate and completed the survey. The five experts consisted of a professor, three associate professors and an assistant professor that were all male. One of the participants responded back via email to further discuss the instrument. A phone interview was set up to further discuss issues regarding language in the survey, to ensure that teachers would not misunderstand, be confused or find the questioning offensive in some manner.

Limited statistical analysis was performed on the data collected from the collegiate expert review and ranking of means for the items under each construct was determined. After discussion with the methodologist, the low number of experts at the collegiate level who participated was determined to be inadequate. Also discussed were the interpretations by those who teach agricultural education at the collegiate level as opposed to how those at the secondary level may interpret the instrument. Seven items were ranked low, and this low ranking called into question initially on the career experience of the researcher. These were considered to be low rankings based upon literature research and conversations with those in the agricultural education field. These items were chosen initially because of their importance in the make up of an agricultural education teacher. After a discussion with the methodologist at that time, it was determined that any item with a mean below 3 was considered a low mean.   These items are shown in Table 3.6.   The researcher felt that middle and high school agricultural education teachers would not rank the importance these particular items as low the collegiate experts ranked them.   Roberts and Dyer (2004b) identified characteristics ranging from motivating students to having a sound knowledge in SAE as part of the effectiveness of an agricultural education teacher. They also recognized that effective teachers were active with their alumni FFA groups.

Table 3.6

Items with Low Mean Ranks from Expert Study (Collegiate Experts)

Domain	Constructs	Items	M(SD) (n=5)
Formal Classroom	Student Engagement	10. Increasing awareness of global agriculture	2.6 (0.55)
	Student Engagement	14. Getting through to the most difficult students.	2.8 (0.45)
	Student Engagement	18. Motivating families to support their children to do well in school.	2.2 (0.84)
	Instructional Strategy	27. Influencing your class size.	2.2 (0.84)
Informal Learning Venue	Project Management	40. Managing an effective alumni chapter.	2.4 (0.55)
	Student Engagement	48. Getting total involvement by all chapter members.	2.8 (1.30)
	Instructional Strategy	61. Incorporating student references and materials into FFA and SAE activities.	2.8 (0.84)

The researcher, with guidance, determined it would be prudent to identify ten teachers considered to be leaders in the fields of middle and/or high school agricultural education. A second expert panel review was performed using this source of high school teachers. An amendment was made to the IRB to include 10 teachers to further review the instrument. Teacher participants were then identified via the researcher's career contacts and recommendations made by Dr. John Ricketts. The ten teachers were then contacted via email and invited to participate in the survey by following a link to the survey. Three teachers completed the review survey, which was determined to be too low of a number to base any of the statistical analysis. After a discussion with the governing body of IRB, the researcher was able to proceed in acquiring more teacher participants without an amendment to the IRB. Thirteen more teachers were invited to participate in the expert review and eight completed the survey. The data from this review of the instrument was then statistically analyzed and the means compared to the previous review by experts at the collegiate level.

From the comparison of the means there were differences in what the collegiate level experts found important as a teacher behavior as compared to what those currently in the middle and/or high school classroom found important (Table 3.7).   The instrument remained as is with no changes. Next step was the Pilot Study.

Table 3.7

Comparison of Low Ranked Items

Domain	Constructs	Items	M(SD) Collegiate (n=5)	M(SD) MS/HS (n=10)
Formal Classroom	Student Engagement	10. Increasing awareness of global agriculture	2.6 (0.55)	3.9 (0.70)
	Student Engagement	14. Getting through to the most difficult students.	2.8 (0.45)	4.0 (0.63)
	Student Engagement	18. Motivating families to support their children to do well in school.	2.2 (0.84)	4.0 (0.94)
	Instructional Strategy	27. Influencing your class size.	2.2 (0.84)	3.6 (1.21)
Informal Learning Venue	Project Management	40. Managing an effective alumni chapter.	2.4 (0.55)	3.7 (1.01)
	Student Engagement	48. Getting total involvement by all chapter members.	2.8 (1.30)	3.9 (0.83)
	Instructional Strategy	61. Incorporating student references and materials into FFA and SAE activities.	2.8 (0.84)	3.9 (0.54)

Pilot study. A pilot study was utilized to obtain input from a sample of agricultural science education teachers similar to those who would be in the actual study. This input was used to test and refine the instrument. The pilot study attempted to answer the following questions:

1. Do the proposed data collection methods work?

2. Is the survey instrument technically adequate?

3. Is the reliability of the instrument satisfactory?

4. Is the construct of the instrument valid?

The pilot had 70 items, broken into 65 self-efficacy items and 14 demographic items. The 65 items composed the six theoretical constructs that are the basis for this research (Table 3.8). The 14 demographic items would collect data for personal and situational characteristics and the outcomes (Table 3.9). Nine items were used to evaluate the teacher self-efficacy beliefs of management in the formal classroom; twelve items were used to evaluate teacher self-efficacy beliefs of student engagement in the formal classroom; twelve items were used to evaluate teacher self-efficacy beliefs of instructional strategies in the formal classroom; twelve items were used to evaluate teacher self-efficacy for project management in the informal learning venue; thirteen items were used to evaluate teacher self-efficacy of students engagement in the informal learning venue; seven items were used to evaluate teacher self-efficacy for instructional strategies in the informal learning venue.

The researcher took recommendations from one of the expert reviewers (collegiate level) who recommended changes in language, but did not change the overall instrument. No items were dropped from the instrument following the expert review with collegiate or middle and/or high school teacher participants. Furthermore, an open ended question comprised the last part of the pilot and was as follows:

- Please feel free to share any critique of the survey. Do you have additional questions that we should consider for the instrument?

This question would not be in the final research study. Rather it was to target any other refinement issues. See Appendix C for pilot version of the survey and Appendix D with all supporting documents.

Table 3.8

Quantity of Items Per Construct

Construct	Number of Items
Teaching Efficacy Beliefs of Management in the Formal Classroom.	9
Teaching Efficacy Beliefs for Student Engagement in the Formal Classroom.	12
Teaching Efficacy Beliefs for Instructional Strategies in the Formal Classroom	12
Teaching Efficacy Beliefs for Project Management in the Informal Learning Venue	12
Teaching Efficacy Beliefs of Student Engagement in the Informal Learning Venue	13
Teaching Efficacy Beliefs of Instructional Strategies in the Informal Learning Venue	7
Total Items	65

The IRB approval obtained for the expert review also provided approval for the pilot along with the main study. The pilot study was sent to 398 randomly selected agricultural education teachers from a list of 800 teacher contacts supplied by the National FFA organization. The pilot survey was sent out using the online software Qualtrics. See Table 3.10 for the approach to data collection.

Table 3.9

Demographic Items and Their Reference Used in Pilot Study

Item	**Reference**
What year were your born?	Personal Characteristic (Age)
What is your race/ethnicity?	Personal Characteristic (Race/ethnicity)
How many years of teaching Agricultural Education have you completed	Personal Characteristic (Years Experience) Outcomes (Teacher Retention)
Do you have an Undergraduate degree in Agricultural Education?	Personal Characteristic (Level of Degree Attainment)
At what level did you receive certification to teach Agricultural Education?	Personal Characteristic (Route to Certification)
What is the highest educational degree you have attained?	Personal Characteristic (Level of Degree Attainment)
Were you a member of FFA in middle and/or high school?	Personal Characteristic (FFA Involvement as Youth)
Is teaching agricultural education a second career?	Personal Characteristic (Previous Career Experience)
At which level are you an agricultural education teacher?	Personal Characteristic (Type of student, not addressed in study)
Job Satisfaction Survey (5 items)	Outcome Characteristic

Table 3.10

Approach to Data Collection for Pilot

Date	Nature of Contact
May 27	Initial contact group 1: cover email letter with survey link
June 10	Second contact- email first reminder with link to survey
June 24	Third contact- final email contact and second reminder with link to survey
July 8	Survey group 1 Closed
October 15	Initial contact to group 2: cover email letter with survey link
October 22	Second contact- email first reminder with link to survey
October 29	Third contact- final email contact and second reminder with link to survey
November 5	Survey group 2 Closed
November 18	Initial contact to group 3: cover email letter with survey link
November 25	Second contact- email first reminder with link to survey
December 2	Third contact- final email contact and second reminder with link to survey
December 9	Survey group 3 Closed

A cover letter was sent introducing the study and providing the link to the survey. The first page of the survey was simply another introduction, though more brief than the email. The survey included the informed consent as the second page of the instrument. If the teacher chose not to participate and selected “No,” Qualtrics would advance them to the last page that stated the researcher’s thanks and appreciation.

The cover letter was emailed to the 398 randomly selected agricultural education teachers, representing group 1. The first reminder, or second contact was emailed to those who had yet to respond two weeks after the initial email was sent. The second, and final reminder was sent two weeks after the first reminder. A PDF version of the instrument was made available as a link in every email contact along with instructions of how to return the completed survey.

The pilot study (group 1) did not yield a response rate that was hoped for, the response rate for the pilot (group 1) was 15%, with only 10% (40 respondents) as useable surveys (Table 3.11). Some reasons behind a low response were theorized.

- Many Agricultural Education teachers work an extended day/extended year calendar, with summers being extremely busy with summer competitions and training.
- The initial 2 week time period between first, second and final contact may have been too long.
- Some Agricultural Education teachers do not work an extended day/extended year calendar, and thus are not accessing work emails as often.
- The survey may have been visually unappealing or too long.
- There was not incentive offered to attract more participation.
- The list of contacts was approximately a year old, so some teachers may have switched schools, school districts, or changed email addresses.

Table 3.11

Summary of Participation and Response Rate for Pilot

Sample	Number Group 1	Number Group 2	Number Group 3
Total random sample	398	1214	1292
Total participants opted out of Qualtrics	0	0	0
Total ineligible participants (email addresses were determined to be “hard bounces” or non-existent	64	104	88
Total eligible participants	334	1110	1204
Total eligible respondents	60	220	275
Total respondents who indicated “No” consent	0	4	4
Total incomplete or unusable	20	0	127
Total useable surveys/respondents	40	216	144

After discussion with the methodologist, a few changes in the approach to acquiring more useable respondents were made. While no changes were made to the actual instrument, changes were made in collection procedures. The following changes were made to increase response rate:

- obtain an up-to-date list of contacts from the National FFA Organization;
- decrease the timing between email contacts from two weeks to one week;
- send out initial contact during the fall semester of the school year;
- use a larger sample for initial contact;

- remove the email contacts from Puerto Rico to avoid issues with language translation.

The second survey was sent out utilizing the same contact strategies described earlier, with exception of the time between reminders. Table 3.10 describes the contacts made during the second survey. Table 3.11 shows that while 1214 invitations were sent out to the group 2, the response rate was still too low with only 17.7% being usable surveys to conduct the statistical analysis needed. A third group of 1292 were invited to participate, and only 11% of those were usable surveys. The decision was made to combine the groups to obtain 400 usable surveys. This was still a low usable survey response rate (13.8%), and not unexpected as past studies have had a low response rate (Anderson, 2008).

Personal and educational characteristics of total pilot respondents. Respondents ranged in age from 23-68 years with a mean age of 41.71 (SD=12.04). Of those self-reporting race/ethnicity, 93% indicated they were White/Caucasian. Respondents to the pilot reported 1 year to 41 years (M=13.91; SD=11.03) as an agricultural science educator. A majority of respondents indicated they had a Bachelor's Degree in Agricultural Education (77%). The three top levels at which respondents had obtained certification to teach Agricultural Science included "Bachelor's Degree" (68.8%), "Master's Degree" (18.5%) and "Alternative Certification" (8.8%). The highest levels of degree obtained by the respondents included "Bachelor's Degree" (43.5%), "Master's Degree" (48.8%), "Specialist's Degree" (3.3%), and "Doctorate Degree" (0.8%). A majority of respondents indicated that they had been a member of FFA while attending middle and/or high school (75.8%). Only 17.8% considered being an

Agricultural Science Education to be a second career. Most respondents indicated they taught at either the high school level (69%) or a combination of middle school and high school (26.5%). See Table 3.12 for a summary of personal characteristics of pilot respondents and Table 3.13 for a summary of the educational characteristics of pilot respondents.

Table 3.12

Personal Characteristics of Pilot Respondents (N=400)

Characteristic	n	Values
Age		M=41.71; SD=12.04
Race		
Caucasian/White	372	93%
African American	4	1.0%
Native American/American Indian	4	1.0%
Latino/Hispanic	5	1.3%
Caucasian/Native American	2	0.5%
African American/Native American	1	0.3%
Multi-Racial	1	0.3%
Caucasian/Hispanic	1	0.3%
Missing Data	1	2.5%
Years Teaching Agricultural Science Education Experience		M=13.91; SD=10.68
Level of Agricultural Science Education Taught		
Middle School	15	3.8%
High School	276	69%
Middle and High School	106	26.5%
Missing data	3	0.8%
Member of FFA in middle and/or high school		
Yes	303	75.8 %
No	9	24%
Missing	1	0.3%
Teaching Agricultural Science Education is a Second Career		
Yes	71	17.8%
No	325	81.3%
Missing data	4	1%

Table 3.13

Educational Characteristics of Pilot Respondents (N=400)

Characteristic	n	Values
Undergraduate Degree in Agricultural Science Education		
Yes	308	77%
No	92	23%
Level Agricultural Education Teaching Certificated Obtained		
Bachelor’s Degree	275	68.8%
Master’s Degree	74	18.5%
Alternative Certification	35	8.8%
Other	15	3.8%
Missing data	1	0.3%
Highest Degree Level Attained		
Bachelor’s Degree	174	30%
Master’s Degree	195	65%
Specialist’s Degree	13	2.5%
Doctorate Degree	3	0.8%
Missing Data	1	2.5%

Instrument validity and reliability. There is not an exact test for validity or if the instrument does in fact measure what it is supposed to measure. For the Teachers’ Sense of Efficacy Scale, Tschannen-Moran and Woolfolk Hoy (2001) attempted to assess the correlation of this instrument and other existing instruments of teachers’ efficacy (Kerlinger, 1986). The researchers determined that participants responded to their scale, to the Rand Items and the Hoy and Woolfolk (1993) adaptation of the Gibson and Dembo TES scale. The total scores of their scales were found to be positively related to the Rand items (r = 0.18 and 0.53, p < 0.01). The scores in their scale were also found to be positively related to both the PTE factor of the Gibson and Dembo measure (r = 0.64,

$p < 0.01$) and the GTE ($r = 0.16$, $p < 0.01$). They determined that the strongest correlations were between their instrument and other measures for the scales that assess the PTE. These are the scales that I incorporated into my instrumentation. Their final assessment was that the Teachers' Sense of Efficacy Scale could be considered reasonably valid and reliable. Although the instrument designed for this study is new and required its own validity, it can be suggested that it will be valid based upon the work previously done with the initial three constructs.

For the instrument used in this study, content validity was determined through the use of an expert panel that verified that the items were representative of their intended measure. Construct validity was determined by using exploratory factor analysis on the pilot study to insure that items are loading onto the correct factor. Initially, the factorability of the 65 Agricultural Education Teacher Self-Efficacy items was examined. The original theory was the 33 items selected to measure the teacher self-efficacy inside the traditional classroom setting would establish a 3-factor structure seen in previous model of Teachers' Sense of Efficacy Scale (Tschannen-Moran and Woolfolk Hoy, 2001). The 3-factor structure theorized consisted of instructional strategies, management, and student engagement. However, when the 33 traditional classroom items were factor analyzed using a principal components analysis, a 6-factor solution resulted instead of the three theorized groupings.

Principal component analysis was used to identify and compute scores for the factors of the Agriculture Education Teacher Self-Efficacy Scale. The initial Eigenvalues showed that the first factor explained 42.51% of the variance, the second factor 7.41% of the variance, and the third factor 5.37%. The fourth, fifth, and sixth factor had Eigenvalues just over 1.0, each construct explaining about 3% of the variance.

Items from the traditional classroom setting were reevaluated and through several steps 15 items were dropped to refine the instrument. Two items originally predicted to be items in the instructional strategies factor loaded more strongly onto the factor containing the student engagement factor. This change in the number of items was because the items eliminated did not contribute to a simple factor structure that was desired. The final 18 items were reanalyzed and a factor analysis conducted on the refined list of items. The result was the three factors explained 65.13% of the variance. The Eigenvalues showed the first factor explained 45.83% of the variance, the second factor 11.55% of the variance and the third factor 7.74% of the variance.

The original three factors predicted for setting of in the formal classroom were renamed to being in the setting of the traditional classroom for better clarification of the setting of teacher self-efficacy measurement. Each of the three factors of inside the classroom setting, classroom management, instructional strategies, and student engagement, were focused down to six items in each factor. For the factor of management in the traditional classroom (MTC) three items were dropped. The factor instructional strategy in the traditional classroom (ISTC) was narrowed by losing five items, two of which were factored into the group of student engagement in the traditional classroom (SETC). Student engagement in the Table 3.14 summarizes the remaining items for classroom management, instructional strategies, and student engagement in the classroom.

Table 3.14

Summary of the Final Items Related to In the Traditional Classroom Setting

Items	ISTC α=.872	MTC α=.913	SETC α=.859
Using alternative strategies in the classroom	-.953		
Using various teaching techniques to meet the needs of the students	-.894		
Adjusting lessons to meet learning needs of students	-.710		
Incorporating hands-on learning through activities	-.670		
Integrating classroom learning with experiential learning	-.658		
Incorporating the most current content into lessons*			.352
Getting students to follow appropriate classroom behavior		-.935	
Minimizing inappropriate classroom behavior		-.911	
Controlling disruptive behavior in the classroom		-.900	
Enforcing rules that you have established		-.833	
Making expectations clear about student behavior in the classroom		-.742	
Maintaining the classroom time		-.656	
Encouraging students to think globally			.899
Encouraging students to think critically			.817
Encouraging student to face challenges			.810
Provoking students to inquire			.694
Making sure students understand complex concepts			.501
Crafting good questions for students			.442

*Item loaded weakly with SETC, but due to wording was best placed with ISTC.

There were 32 items that were predicted to measure teacher self-efficacy in the informal setting of FFA/SAE. The approach of instructional strategies, management, and student engagement that was used in the earlier group in the formal classroom setting was adapted for use with the informal setting of FFA/SAE. The theorized constructs for the informal setting of FFA/SAE were instructional strategies, project management, and student engagement. Initial factor analysis of this portion of the instrument resulted not in the 3-factor structure that was originally predicted, but rather a 5-factor structure emerged. The Eigenvalues showed the first factor explained 51.32% of the variance, the second 6.90% of the variance, the third 5.15% of the variance, the fourth 4.02% of the variance, and the fifth 3.17% of the variance.

Just as was done for groupings in the classroom, the language was adjusted from "in the informal setting of FFA/SAE" to "outside the traditional classroom". The 5-factor structure had to be adapted to a smaller manageable factor structure. However, the refinement of the instrument resulted in a 4-factor structure. There was a clear separation in the SAE and FFA areas, thus providing two new factors named "role as an FFA advisor outside the traditional classroom" (FAOC) and "role as a SAE advisor outside the traditional classroom" (SAOC). The other two factors consisted of items that revolved around student engagement of the student and a combination of the student and what is being entitled stakeholder. The stakeholder encompasses alumni, community, and families. The last two factors were newly titled "student FFA/SAE engagement outside the traditional classroom" (SEOC) and "student/stakeholder FFA/SAE engagement outside the traditional classroom" (SSOC).

The new factor analysis showed that the 26 items making up the part of the instrument that measured teacher self-efficacy outside the traditional classroom measured 72.13% of the variance. The Eigenvalues showed that the first factor explained 53.71% of the variance, the second 8.24% of the variance, the third 6.28% of the variance, and the fourth 3.90% of the variance. Table 3.15 summarizes the final items related to outside the traditional classroom setting.

Table 3.15

Summary of Final Items Related to Outside the Traditional Classroom Setting

Items	FAOC α=.915	SAOC α=.947	SEOC α=.911	SSOC α=.918
Ensuring the state and national deadlines are met (FFA,SAE, other)	.887			
Ensuring the accuracy in FFA chapter rosters	.851			
Supervising FFA chapter activities	.737			
Staying informed about FFA activities (programs, events and resources)	.612			
Maintaining the records for FFA	.517			
Ensuring students meet appropriate FFA/SAE deadlines	.405			
Establishing structure to FFA meetings	.341			
Developing an engaging (well-rounded) FFA program (active with any of the following local community, school, and national organization)	.333			
Increasing student knowledge about SAE project		.879		
Making SAE requirements understood by students		.857		
Maintaining logistics involved with SAE		.846		
Managing relevant SAE programs for students		.827		
Maintaining the records for SAE		.825		
Encouraging students to seek out learning opportunities beyond the classroom			.841	
Encouraging students to seek out a project based on their interest			.823	
Helping students learn through experiential learning			.696	
Encouraging students to work in the community			.695	
Encouraging students to assume leadership roles			.684	
Getting students to assume leadership roles			.435	
Motivating new students' families to be involved in FFA				.779
Motivating new students to be involved in FFA				.694
Fostering cooperation between school FFA chapter and local communities				.691
Getting students to participate in competitive events				.622
Encouraging students to be involved in competitions				.515
Getting students to work in the community				.490
Motivating student citizenship				.427

In conducting this quantitative study, reliability and validity play an important role in value of the data collected. Reliability indicates whether the instrument is measuring something consistently, it does not necessarily mean than it measure what is supposed to be measuring. In other words, the resulting scores from data collection would not occur by random or systematic measurement error. In the case of this study, the Teachers' Sense of Efficacy scale from which I adapted the basis of the constructs of my instrument has been studied extensively resulting in very good reliability data. Tschannen-Moran and Woolfolk Hoy (2001) determined internal consistency reliability, which indicates how well the items in the instrument reflect a common construct (Spector, 1992). This internal consistency is often used to measure the overall reliability of an instrument; however, these researchers also determined the reliability of the subscales of teacher efficacy belief in engagement, instructional strategies, and classroom management. If these measures are low, then the instrument could be determined as not the best for measurement of teacher efficacy. However, overall instrument reliability was found to be .94 for the long form with the subscales of engagement, instructional strategy, and

classroom management measuring .87, .91, and .90 respectively. Thus, this instrument has a proven record of reliability. However for this study, since the instrument a combination of new and adapted, reliability will be determined by determining the co-efficient alpha by conducting internal consistency for the pilot and main study. For this study, the reliabilities measured for ISTC, MTC, and SETC in the traditional classroom .87, .91, and .86 respectively. Reliabilities for FAOC, SAOC, SEOC, and SSOC were found to be .91, .95, .91, and .92 respectively.

Additional changes from pilot study. During the analysis of data from the pilot, it was determined that some questions needed to be added. The only outcome variable originally included was that of job satisfaction, thus innovative teaching, program impacts and teacher retention were added to the outcome variables. Demographic data was collected for age, race/ethnicity, gender, years of teaching experience, route to certification, level of degree attainment, previous career experience, FFA involvement as a youth, and level at which they teach. It was determined by the demographic results of the pilot (Table 3.12), that using Race/Ethnicity, as a predictor variable would not yield enough diversity to be an effective measure. Since 93% were reported to be Caucasian, and the remaining 7% were spread over varying races/ethnicities, it would not yield enough to use as a valuable predictor. So this predictor variable was dropped from the instrument.

Discussion with the methodologist raised the questions about the Situational Characteristics that were discussed earlier in Chapter III but not measured in the three pilot groups. Three additional sections of questions were added to the final instrument to collect data for school resources, school support, and supervisor support. These are self-reported by the teacher by three questions in each section in which the teachers were asked to evaluate to what degree they felt their school provided, school supported, and supervisor supported them (Table 3.16). A 3-point summated rating scale asking to what degree with Not at all, Some, but not enough, or Enough.

Table 3.16

New Items to Measure Situational Characteristic Variables

Situational Characteristic	Items
School Resources	Equipment for all your classes
	Space for all your classes
	Funding for all your classes
School Support	Your agriculture education program
	You/your students' FFA activities
	You/your students' SAE activities
Supervisor Support	Agriculture education teacher
	FFA advisor
	SAE advisor

Also identified as needed to be measure were other outcome variables, Innovative Teaching and Program Impact. As with the situational variable these measurements are based on the self-reporting of the teacher. Teachers were asked to indicate how often they used three concepts of innovative teaching practices that were identified via conversations with agricultural education teachers and literature research. A 3-point summated rating scale (Never, Sometimes, Always) was used to ask teachers how often they used hands-on activities, a rigorous curriculum, or current instructional technology (Table 3.17).

Table 3.17

Innovative Teaching and Program Impact Items for Final Instrument

Outcome Variables	Items
Innovative Teaching	Hands-on activities to teach agricultural education concepts A rigorous curriculum Current instructional technology
Program Impacts	My agriculture education program impacts my students' overall educational experience. My agriculture education program increase my students' academic skills My agriculture education program increased my students' leadership skills

Teachers were also asked to self-report on their Agricultural Education program impacts. A 6-point summated rating scale (Strongly Disagree, Moderately Disagree, Slightly Disagree, Slightly Agree, Moderately Agree, and Strongly Agree) was used to measure to what extent they agreed with the statements concerning program impacts on students' overall educational experience, increased students' academic skills, or increased students' leadership skills (Table 3.17). As with the previous measure of the use of Innovative Teaching, these items were identified via literature research and discussions with agricultural educators.

Population and Sample

The research population consisted of the more than 11,000 teachers recognized by the National FFA Organization as FFA advisors. Some schools may have more than one agricultural science teacher but only one of these teachers will be considered the FFA advisor. There is no perfect listing of every agricultural science education teacher in the United States of America.

The research sample of this study consisted of the FFA advisors working in middle and high schools throughout the United States. The sample was randomly selected from a database list from the National FFA organization. One advantage of this list is that it is large and diverse. Once the list was obtained a colleague, Sharon P. Kane, assisted with obtaining a sample of 2,989. This sample was obtained utilizing the Stata® Data Analysis and Statistical Software to place the contacts into the four regions of FFA, Western, Southern, Central, and Eastern.

Data Collection Plan

Prior to collection of data the following steps were completed: (1) obtained permission from National FFA to utilize the database of FFA advisors; and (2) obtained permission from the Institutional Review Board and Human Subjects Office of The University of Georgia to conduct the research.

Administering the Questionnaire

This quantitative study was conducted utilizing the Internet survey tool Qualtrics®. A previous study (Anderson, 2008) indicated that this population, at least in the state of Georgia level, used e-mail as their primary means of communication and that utilizing an Internet based instrument was appropriate for this group. Each individual received a link to the electronic survey (Appendix E) from an invitation e-mail (Appendix F). Two separate reminders were sent to those who had yet to complete the survey. See Table 3.18 for a summary of the approach to data collection. This process was actually repeated in an effort to obtain a larger number of eligible completed surveys.

Table 3.18

Approach to Data Collection

Date	Nature of Contact
May 12	Initial email including link to survey
May 19	Second contact- email first reminder with link to survey
May 26	Third contact- final email contact and second reminder with link to survey
June 2	Survey Closed

To collect the data, Dillman's (2007) multiple contact strategy was implemented. The initial contact was made via e-mail that included a request of participation (Appendix F) containing a hyperlink to the survey entry page and consent form (Appendix E). One week after the initial contact a follow-up thank you and request for participation (Appendix F) was sent to those who had not yet completed the survey. And finally, two weeks after the initial contact a final request for participation (Appendix F) was sent out. Each contact was sent via e-mail and contained the hyperlink to the survey and the investigator's contact information for respondents to utilize for communication if needed. Each contact also included a link to a PDF version that could be completed and returned to the researcher.

Since this is an Internet questionnaire complete anonymity can not be ensured, however the respondents' confidentiality was to be ensured by following certain procedures: (1) there was no collection or record of the respondents' IP addresses; (2) e-mail addresses for the entire sample would only be collected and utilized to send updates and reminders during the course of the time established to collect data; (3) all e-mail addresses were be kept separately from data collected and destroyed upon completion of data collection; and (4) only the investigator would have access to the data.

Minimizing Errors

Since a questionnaire was used to collect data, there would be the issue of error that could occur during this process (Dillman, Smyth, & Christian, 2008). There are two types of errors that can be of concern for this type of research. The first is the nonresponse error that occurs when those selected to participate in the survey do not respond, which could impact the survey results. To minimize this error, the survey and accompanying cover letter needed to encourage people to respond to ensure that the teachers from differing demographics were well represented and beneficial to the study (Dillman et al., 2008). Shropshire, Hawdon, and Witte (2009) found that early termination of a survey would result because the individual lost interest in the survey. Therefore this survey needed to be of a length that would obtain the data needed for the study but respect that if it is too long then I could lose the participant resulting in termination of a survey. Other steps to consider were to make sure the participants understand how the survey results would be used and this would be beneficial to them (Dillman et al., 2008). Since the survey was conducted via the Internet the design was important, as was the structure of the questions, and respondent participation needed to be maintained until the completion of the survey.

The other error that may present a problem for this study is that of the response error. Sudman and Bradburn (1982) define this type of error as occurring due to the participant not providing their true opinions, misunderstanding the question, or attempt to always answer such that they put themselves into a favorable light. To avoid this type of error, information will be provided in the cover letter to explain the necessity for them to be honest and to ensure that all their answers will remain secure and confidential. The letter will also entail exactly what the study is about in hopes that if the participants understand the importance of the study this will out weigh the hesitation to be completely honest. Both types of errors can be reduced by the use of Dilman's (2000) social exchange theory that will help to create respondent trust and perceptions of reward while reducing what the respondent might see as a cost for completing the survey. See Table 3.19 for a summary of the participation and response rate for the study.

Table 3.19

Summary of Participation and Response Rate for Study

Sample	Number
Total random sample	2989
Total participants who requested removal from study	3
Total ineligible participants (email addresses were determined to be "hard bounces" or non-existent	304
Total eligible participants	2682
Total eligible respondents	527
Total participants who indicated "No" consent	9
Total incomplete or unusable surveys	116
Total useable surveys/respondents	402 (14.99%)

Data Preparation

The collected survey responses were exported from Qualtrics® into an Excel spreadsheet for data cleaning. The initial step to clean data was to remove any surveys that were identified as unusable based on blank questionnaire responses. Data involving age was calculated by subtracting the respondents' entry of year they were born from the current year (2014). Assigning numbers to each category of race entered will convert race to a standard.

Data was imported into SPSS 22.0 for further preparation and analysis. This preparation involved the appropriate labeling of all nominal, ordinal, or categorical data.

Data Analysis Plan

Data analysis for this study was conducted utilizing SPSS 22.0 available at the University of Georgia. To answer question one concerning the measure of teacher efficacy of alternatively certified agricultural education teachers, means and ranks for each efficacy's items were calculated and reported. Initial steps in the analysis of the data included performing descriptive statistics consisting of means, standard deviations, and correlation among the study variables. To answer question two, a series of bivariate and multivariate analyses were conducted to determine the extent personal and situational characteristics predict teacher efficacy. Bivariate and multivariate analyses were conducted to determine the extent the efficacy measure could predict outcomes of job satisfaction, the teacher's perception of program impact on students, and teacher retention.

Limitations

The issues facing the sample availability limit this study. While this study is a national study, the fact the past studies (Anderson, 2008) have had a lower number of responses in a single state is problematic. A low response rate, 14.99%, makes this study difficult to generalize the findings beyond the research sample. Another limit to this study is that not all agricultural education teachers may be active members in FFA, as some schools have more than one agricultural science education teacher. This limitation impacts the research population of the study. Another limitation to consider is that of the self-report of outcomes, teachers perceived outcome could be greater or better than the actual outcome.

CHAPTER IV

RESULTS

Chapter IV describes the result of data analysis, including descriptive statistics, factor analysis and multivariate analysis. The purpose of this study was to investigate the extent of teacher self-efficacy beliefs of agricultural science education teachers. The questions that guided this study were:

1. What are the perceived teacher self-efficacy beliefs of agricultural science education teachers?
2. What are the differences occurring in the perceived teacher self-efficacy beliefs of alternatively certified agricultural science education teachers as compared to the traditionally certified?
3. To what extent do personal and situational characteristics impact the perceived teacher self-efficacy beliefs of agricultural science education teachers?
4. To what extent are personal and situational characteristics and self-efficacy beliefs predictive of designated outcomes of innovative teaching, job satisfaction, program impacts, and teacher retention?

Descriptive Statistics

Descriptive statistics were conduced on the personal and educational characteristics of the study participants. Means, frequencies, and standard deviations were determined for age, years teaching experience, years at current school, level of agricultural education taught, youth FFA membership, teaching agricultural education as a second career, undergraduate degree in Agricultural Education, level at which certification is obtained, and highest level obtained. The next section in which descriptive statistics were used to determine means and frequencies included the situational characteristics school resources, school support and supervisor support. The last section that means and frequencies were determined was the items and constructs making up the teacher self-efficacy instrument used in this study.

Personal and Educational Characteristics of Study Participants

Study respondents ranged in age from 22 year to 70 years with a mean age of 41.03 (SD=12.017). Respondents completing the survey indicated 1 year to 46 years as an Agricultural Science Education teacher. Of the 402 survey participants 85 teachers (21.1%) indicated they had taught for three years or less. Also 123 (30.6%) of the teachers indicated they had been at their current school for three years or less. A majority of the respondents reported they had an undergraduate degree in Agricultural Education (79.1%). The levels at which certification to teach Agricultural Education was attained included “Bachelor’s Degree” (78.9%), “Master’s Degree” (12.2%), “Alternative Certification” (7.5%), and “Other” (1.2%). The respondents indicated that their highest level of degree completed was “Bachelor Degree” (47%), “Master’s Degree” (46.3%), “Specialist’s Degree” (3.2%), “Doctorate Degree” (2.0%), and “Other” (1.2%). A majority of the respondents reported they were members of FFA when in middle and/or high school (79.4%). A small percentage reported that being an Agricultural Education teacher was a second career (18.7%). The majority of the respondents indicated they taught at either the high school (67.2%) or the combination of middle and high school level (28.6%).   See Tables 4.1 and 4.2 for a summary of the personal and education characteristics of the respondents.

Table 4.1

Personal Characteristics of Study Respondents (N=402)

Characteristic	n	Values
Age		M=41.03; SD=12.02
Missing data	2	
Years Teaching Agricultural Science Education Experience		M=13.87; SD=10.87
Years at Current School		M=10.27; SD=9.39
Level of Agricultural Science Education Taught		
Middle School	14	3.5%
High School	270	67.2%
Middle and High School	115	28.6%
All three levels, Elementary, Middle, and High School	1	0.2%
Missing data	2	0.5%
Member of FFA in middle and/or high school		
Yes	319	79.4%
No	81	20.1%
Missing data	2	0.5%
Teaching Agricultural Science Education is a Second Career		
Yes	75	18.7%
No	326	81.1%
Missing data	1	0.2%

Table 4.2

Educational Characteristics of Study Respondents (N=402)

Characteristic	n	Values
Undergraduate Degree in Agricultural Science Education		
Yes	318	79.1%
No	84	20.9%
Level Agricultural Education Teaching Certificated Obtained		
Bachelor's Degree	317	78.9%
Master's Degree	49	12.2%
Alternative Certification	30	7.5%
Other	5	1.2%
Missing data	1	0.2%
Highest Degree Level Attained		
Bachelor's Degree	189	47%
Master's Degree	186	46.3%
Specialist's Degree	13	3.2%
Doctorate Degree	8	2.0%
Other	5	1.2%
Missing data	1	0.2%

Situational and Outcome Characteristics of Student Participants

Three situational characteristics were identified for agricultural education teachers, School Resources, School Support, and Supervisor Support. Teachers were asked to self-report to what degree they had resources, school support or supervisor support with three items in each of the characteristics. A majority of the teachers felt their school resources were supported to "some" degree in the areas of equipment for their classes (53.7%) and funding for all their classes (52.5%). The majority of the teachers felt their need for space was supported to "some" (44.8%) or "enough" (48.8%)

degree. Table 4.3 provides a summary of the situational characteristics of the teacher participants.

Teachers were asked to evaluate to what degree the school supported their agriculture education program, their and their students' FFA activities, and their and their students' SAE activities. A majority of the teachers felt the school supported to an "enough" degree their agriculture education program (57.7%) and the FFA activities of the teacher and their students (56.2%).   The respondents indicated that the SAE activities of the teacher and their students supported to "Some" degree (42.8%), though more of the teachers felt that this supported to "Enough" degree (48.5%). Teachers reported that their supervisors provided "Enough" support in their role as an Agriculture education teacher (67.2%), as an FFA advisor (63.7%) and as an SAE advisor (50.5%). See Table 4.3 for a complete summary of the means, standard deviations and frequencies.

Table 4.3

Frequencies and Means for Situational Characteristics of Agricultural Education Teachers (n=402)

Item	Question	M	SD	Range	Not at all		Some		Enough	
					n	%	n	%	n	%
School Resources	Equipment for all your classes	2.37	.569	1-3	18	4.5	216	53.7	166	41.3
	Space for all your classes	2.43	.605	1-3	24	6.0	180	44.8	196	48.8
	Funding for all your classes	2.27	.632	1-3	40	10.0	211	52.5	148	36.8
School Support	Your agriculture education program	2.55	.550	1-3	11	2.7	157	39.1	232	57.7
	You/Your students' FFA activities	2.54	.556	1-3	12	3.0	162	40.3	226	56.2
	You/Your students' SAE activities	2.41	.635	1-3	32	8.0	172	42.8	195	48.5
Supervisor Support	Agriculture education teacher	2.64	.549	1-3	14	3.5	116	28.9	270	67.2
	FFA advisor	2.59	.585	1-3	20	5.0	125	31.1	256	63.7
	SAE advisor	2.38	.702	1-3	51	12.7	145	36.1	203	50.5

Note: n's vary slightly due to missing data.

Outcome characteristics were also addressed (referred to as Outcome variables in Chapter III). One of these characteristics was job satisfaction, and it was measured utilizing the Brayfield and Rothe (1951) Job Satisfaction Index. A majority of the teachers reported that they "felt fairly satisfied" in their position (56.5% Agreed and 30.1% Strongly Agreed). This trend was also reflected in two other items of the job satisfaction scale, "most days I am enthusiastic about my work" and "I find real enjoyment in my work". Two of the items were reverse scored questions, and as expected very few teachers felt that "each day of work seems like it will never end" (4.7%) and "considers job rather unpleasant" (1.2%). Table 4.4 shows the means, standard deviations, and frequencies for Outcome Characteristic of Job Satisfaction.

Table 4.4

Means and Frequencies for Outcome Characteristic Job Satisfaction (n=402)

Item	Mean	SD	Strongly Disagree		Disagree		Neither Agree or Disagree		Agree		Strongly Agree	
			n	%	n	%	n	%	n	%	n	%
I feel fairly satisfied with my present job	4.09	.821	6	1.5%	17	4.2%	31	7.7%	227	56.5%	121	30.1%
Most days I am enthusiastic about my work	4.17	.726	3	0.7%	9	2.2%	32	8.0%	230	57.2%	128	31.8%
Each day of work seems like it will never end	2.35	1.019	71	17.7%	190	47.3%	87	21.6%	34	8.5%	19	4.7%
I find real enjoyment in my work	4.19	.689	1	0.2%	7	1.7%	37	9.2%	225	56%	130	32.3%
I consider my job rather unpleasant	1.72	.854	191	47.5%	154	38.3%	40	10%	12	3%	5	1.2%

Note: n’s vary slightly due to missing data.

The second outcome characteristic evaluated was innovative teaching. Teachers via three items were asked to self-report on their utilization of innovative teaching techniques. A majority of teachers reported that they always use hands-on techniques to teach agriculture education concepts (60.7%). Teachers "sometimes" (47.8%) and "always" (49.8%) used a rigorous curriculum. Teachers "sometimes" (55.5%) utilized current instructional technology. Table 4.5 summarizes the frequencies, percentages, means, and standard deviations for the characteristic Innovative Teaching.

Table 4.5

Frequencies and Means for Outcome Characteristic Innovative Teaching (n=402)

			Never		Sometimes		Always	
How often they use:	Mean	SD	n	%	n	%	n	%
Hands-on activities to teach agricultural education concepts	2.61	.488	0	0%	156	38.8%	244	60.7%
A rigorous curriculum	2.49	.530	6	1.5%	192	47.8%	200	49.8%
Current instructional technology	2.43	.510	3	0.7%	223	55.5%	174	43.3%

Note: n's vary slightly due to missing data

The final outcome characteristic evaluated in teachers was that of program impact (Table 4.6). Teachers were once again asked to self-report the impact of the program via three items. Most teachers strongly agreed that their agriculture education program impacts their students overall educational experience (64.2%) and increased the students' leadership skills (66.7%). Teachers moderately agreed (38.1%) and strongly agreed (49.5%) that their program increased their students' skills.

Table 4.6

Frequencies for Outcome Characteristic Program Impacts (n=402)

My agriculture education program:	Mean	SD	Strongly Disagree		Moderately Disagree		Slightly Disagree		Slightly Agree		Moderately Agree		Strongly Agree	
			n	%	n	%	n	%	n	%	n	%	n	%
Impacts my students' overall educational experience	5.50	.599	0	0	0%	0%	0	0%	23	5.7%	120	29.9%	258	64.2%
Increases my students' academic skills	5.37	.708	0	0	0%	0%	2	0.5%	48	11.9%	153	38.1%	199	49.5%
Increased my students' leadership skills	5.58	.643	0	0	0%	0%	1	0.2%	31	7.7%	102	25.4%	268	66.7%

Note: n's vary slightly due to missing data

Perceived Teacher Self-Efficacy Beliefs

To address the question what are the perceived teacher self-efficacy beliefs of agricultural science education teachers, teacher self-efficacy in agricultural education was assessed using a researcher-created instrument with two governing domains of traditional classroom and outside the traditional classroom (consisting of FFA and SAE). Each domain had categories within them. Three categories, classroom management (MTC), instructional strategies (ISTC), and student engagement (SETC) were the focus of the traditional classroom domain. Outside the traditional classroom domain is made up of student FFA/SAE Engagement (SEOC), student and stakeholders FFA/SAE engagement (SSOC), FFA advisor (FAOC), and SAE advisor (SAOC). Table 4.7 provides a reference to agricultural teacher self-efficacy acronyms that can be utilized as a reference through Chapter IV.

Table 4.7

Agricultural Education Teacher Self-Efficacy Constructs

Construct	Construct title
ISTC	Instructional Strategies in the Traditional Classroom
MTC	Management in the Traditional Classroom
SETC	Student Engagement in the Traditional Classroom
FAOC	FFA Advisor Outside the Traditional Classroom
SAOC	SAE Advisor Outside the Traditional Classroom
SEOC	Student FFA/SAE Engagement Outside the Traditional Classroom
SSOC	Student and Stakeholders FFA/SAE Engagement Outside the Traditional Classroom

In Management in the Traditional Classroom (MTC) category (Table 4.8), teachers indicated they are very good at executing all the behaviors. Over 48% of teachers reported to be very good at two items, controlling disruptive behavior in the classroom and getting students to follow appropriate classroom behavior. There were two items in which more than 23% of teachers found they were excellent at execution, making student classroom behavior expectations clear and enforcing rules that you have established. These two items had the highest means, 3.93 and 3.83 respectively (Table 4.8).

For other aspects of statistical analysis that go beyond of item-level analysis, summated means were determined for each of the constructs. The scores of the six items of the MTC construct were summed totaled for each survey respondent. A mean summated score was then developed for MTC. This summated mean for MTC was 22.65 (SD=4.10) (Table 4.16).

Table 4.8

Agricultural Teacher Self-Efficacy in Management in the Traditional Classroom: Means and Frequencies (n=402)

			Poor		Fair		Good		Very Good		Excellent	
How well do you execute:	Mean	SD	n	%	n	%	n	%	n	%	n	%
Controlling disruptive behavior in the classroom	3.76	.845	1	0.2%	31	7.7%	105	26.1%	193	48%	72	17.9%
Minimizing inappropriate classroom behavior	3.74	.812	1	0.2%	22	5.5%	128	31.8%	183	45.5%	68	16.9%
Getting students to follow appropriate classroom behavior	3.75	.783	0	0%	21	5.2%	123	30.6%	194	48.3%	64	15.9%
Maintaining the classroom time	3.66	.794	1	0.2%	22	5.5%	145	36.1%	177	44%	56	13.9%
Making student classroom behavior expectations clear	3.93	.839	0	0%	22	5.5%	90	22.4%	184	45.8%	106	26.4%
Enforcing rules that you have established	3.83	.865	2	0.5%	20	5%	117	29.1%	167	41.5%	96	23.9%

Note: n’s vary slightly due to missing data

In the Student Engagement in the Traditional Classroom (SETC) construct, there were three items that teachers felt they were very good at executing (Table 4.9). These three items, encouraging students to think critically, encouraging students to face challenges, and provoking students to inquire, had the highest means 3.71, 3.81, and 3.54 respectively (Table 4.9). Two items, encouraging students to think globally and crafting good questions for students, had a majority of teachers reporting that they were good at executing those behaviors. A majority of teachers reported they were good or very good at making students understand complex concepts.

In addition to the item level analyses, the individual item scores for this construct were summed to produce a construct score. The scores of the six items of the SETC construct were totaled for each survey respondent and a mean score determined. A mean summated score was then developed for SETC. This summated mean for SETC is 21.30 (SD=3.92) (Table 4.16).

Table 4.9

Agricultural Teacher Self-Efficacy in Student Engagement in the Traditional Classroom: Frequencies and Means (n=402)

			Poor		Fair		Good		Very Good		Excellent	
How well do you execute:	Mean	SD	n	%	n	%	n	%	n	%	n	%
Encouraging students to think globally	3.36	.902	7	1.7%	57	14.2%	162	40.3%	137	34.1%	39	9.7%
Encouraging students to think critically	3.71	.782	0	0%	24	6%	125	31.1%	195	48.5%	57	14.2%
Encouraging students to face challenges	3.81	.762	1	0.2%	18	4.5%	102	25.4%	216	53.7%	64	15.9%
Provoking students to inquire	3.54	.845	3	.07%	39	9.7%	144	35.8%	170	42.3%	45	11.2%
Making students understand complex concepts	3.46	.879	5	1.2%	46	11.4%	153	38.1%	154	38.3%	44	10.9%
Crafting good questions for students	3.45	.743	2	0.5%	28	7.0%	187	46.5%	158	39.3%	27	67%

Note: n's vary slightly due to missing data

The Instructional Strategies in the Traditional Classroom (ISTC) construct trended much like MTC, with a majority of teachers reporting to be very good at the behaviors of this construct (Table 4.10). This particular construct had a majority of the teachers scoring items as Good or Very Good. Though one item, incorporating hands-on learning through activities, finds the majority of teachers indicating they perform this behavior very good or excellent. In fact the mean score for this item was 4.14 (SD=.810) (Table 4.10).

In addition to the item level analyses, the individual item scores for this construct were summed to produce a construct score. The scores of the six items of the MTC construct were totaled for each survey respondent and a mean score determined. A mean summated score was then developed for MTC. This summated mean for MTC is 22.65 (SD=4.10) (Table 4.16).

Table 4.10

Agricultural Teacher Self-Efficacy in Instructional Strategies in the Traditional Classroom: Frequencies and Means (N=402)

			Poor		Fair		Good		Very Good		Excellent	
How well do you execute:	Mean	SD	n	%	n	%	n	%	n	%	n	%
Adjusting lessons to meet learning needs of students	3.61	.839	2	0.5%	32	8%	143	35.6%	169	42%	55	13.7%
Using alternative strategies in the classroom	3.71	.907	2	0.5%	42	10.4%	101	25.1%	181	45%	76	18.9%
Using various teaching techniques to meet the needs of students	3.81	.847	1	0.2%	24	6%	111	27.6%	180	44.8%	86	21.4%
Integrating classroom learning with experiential learning	3.83	.863	0	0%	25	6.2%	114	28.4%	167	41.5%	96	23.9%
Incorporating hands-on learning through activities	4.14	.810	0	0%	14	3.5%	65	16.2%	173	43%	150	37.3%
Incorporating the most current content into lessons	3.71	.879	0	0.5%	30	7.5%	127	31.6%	165	41%	78	19.4%

Note: n's vary slightly due to missing data

In the construct, Student FFA/SAE Engagement outside the Traditional Classroom (SEOC), again the trend of a majority of teachers indicating they are very good at performing the behaviors that constitute this construct (Table 4.11). Also, a second grouping of majority teachers indicates they are good at performing the six behaviors. However, one item, encouraging students to seek out a project based on their interest, was also indicative of teachers feeling that they perform this behavior with excellence. This item had the highest means of all the items within this construct at 3.96 (SD=.801) (Table 4.11).

In addition to the item level analyses, the individual item scores for this construct were summed to produce a construct score. The scores of the six items of the SEOC construct were totaled for each survey respondent and a mean score determined. A mean summated score was then developed for SEOC. This summated mean for SEOC is 22.81 (SD=4.10) (Table 4.16).

Table 4.11

Agricultural Teacher Self-Efficacy of Student FFA/SAE Engagement Outside the Traditional Classroom (SEOC): Frequencies and Means (n=402)

			Poor		Fair		Good		Very Good		Excellent	
How well do you execute:	Mean	SD	n	%	n	%	n	%	n	%	n	%
Helping students learn through experiential learning	3.79	.823	2	0.5%	18	4.5%	124	30.8%	181	45%	77	19.2%
Encouraging students to seek out learning opportunities beyond the classroom	3.84	.807	0	0%	18	4.5%	115	28.6%	184	45.8%	85	21.1%
Encouraging students to seek out a project based on their interest	3.96	.801	0	0%	14	3.5%	95	23.6%	186	46.3%	107	26.6%
Encouraging students to assume leadership roles	3.81	.850	1	0.2%	31	7.7%	91	22.6%	199	49.5%	80	19.9%
Encouraging students to work in the community	3.75	.837	1	0.2%	25	6.2%	122	30.3%	179	44.5%	75	18.7%
Getting students to assume leadership roles	3.77	.886	0	0%	31	7.7%	120	29.9%	159	39.6%	91	22.6%

Note: n's vary slightly due to missing data

In the Student and Stakeholder FFA/SAE Engagement outside the Traditional Classroom (SSOC) construct, the majority of teachers reporting that they are good and very good at performing the behaviors follows the trends of previous constructs (Table 4.12). In fact, the majority of teachers reported to be good, very good, and excellent at performing the behaviors in this construct. There were three items that were lower in percentage of teacher performing with excellence. These items were getting students to work in community, motivating student citizenship, and motivating new students' families to be involved in FFA. One item, encouraging students to be involved in competitions, rated high in good, very good, excellent and the mean was 3.83 (SD=.853) (Table 4.12).

In addition to the item level analyses, the individual item scores for this construct were summed to produce a construct score. The scores of the six items of the SSOC construct were totaled for each survey respondent and a mean score determined. A mean summated score was then developed for SSOC. This summated mean for SSOC is 25.22 (SD=5.19) (Table 4.16).

Table 4.12

Agricultural Teacher Self-Efficacy of Student FFA/SAE Engagement Outside the Traditional Classroom (SSOC): Frequencies and Means (N=402)

			Poor		Fair		Good		Very Good		Excellent	
How well do you execute:	Mean	SD	n	%	n	%	n	%	n	%	n	%
Encouraging students to be involved in competitions	3.83	.850	2	0.5%	28	7%	90	22.4%	200	49.8%	82	20.4%
Getting students to work in community	3.53	.858	2	0.5%	37	9.2%	145	36.1%	161	40%	55	13.7%
Getting students to participate in competitive events	3.71	.913	4	1%	35	8.7%	114	28.4%	170	42.3%	78	19.4%
Motivating student citizenship	3.58	.846	3	0.7%	33	8.2%	144	35.8%	168	41.8%	52	12.9%
Motivating new students to be involved in FFA	3.68	.939	5	1.2%	39	9.7%	115	28.6%	164	40.8%	79	19.7%
Motivating new students' families to be involved in FFA	3.21	1.011	16	4%	82	20.4%	145	36.1%	118	29.4%	41	10.2%
Fostering cooperation between school FFA chapter and local communities	3.69	.938	3	0.7%	42	10.4%	115	28.6%	160	39.8%	82	20.4%

Note: n's vary slightly due to missing data

In the FFA Advisor outside the Traditional Classroom (FAOC) construct a majority of teachers reported to be good or very good at performing behaviors. The item dealing with maintaining the records of FFA was scored on the lower end with the majority of teachers reporting to be good at this (Table 4.13) resulting in a mean for this item of 3.35 (SD=.997).

In addition to the item level analyses, the individual item scores for this construct were summed to produce a construct score. The scores of the six items of the FAOC construct were totaled for each survey respondent and a mean score determined. A mean summated score was then developed for FAOC. This summated mean for FAOC is 30.44 (SD=5.91) (Table 4.16).

Table 4.13

Agricultural Teacher Self-Efficacy of their role as the FFA Advisor Outside the Traditional Classroom (FAOC): Frequencies and Means (n=402)

			Poor		Fair		Good		Very Good		Excellent	
How well do you execute:	Mean	SD	n	%	n	%	n	%	n	%	n	%
Maintaining the records of FFA	3.35	.997	11	2.7%	66	16.4%	149	37.1%	121	30.1%	54	13.4%
Ensuring the accuracy in FFA chapter rosters	3.87	.877	1	0.2%	27	6.7%	96	23.9%	176	43.8%	102	25.4%
Ensuring the state and national deadlines are met (FFA, SAE, other)	3.84	.957	2	0.5%	40	10%	88	21.9%	161	40%	111	27.6%
Supervising FFA chapter activities	4.25	.777	1	0.2%	10	2.5%	47	11.7%	172	42.8%	171	42.5%
Establishing a structure to FFA meeting	3.72	.983	9	2.2%	37	9.2%	100	24.9%	166	41.3%	89	22.1%
Developing an engaging FFA program (active with any of the following local community, school, national organization	3.78	.921	4	1%	31	7.7%	108	26.9%	167	41.5%	92	22.9%
Ensuring students meet appropriate FFA/SAE deadlines	3.75	.936	5	1.2%	28	7%	123	30.6%	123	37.3%	95	23.6%
Staying informed about FFA activities (programs, events, and resources)	3.92	.888	1	0.2%	24	6%	97	24.1%	163	40.5%	116	28.9%

Note: n's vary slightly due to missing data

In the SAE Advisor outside the Traditional Classroom (SAOC) construct the trend seen in the previous constructs appears in this construct as well. A majority of the teachers report that are good or very good at performing the behaviors related to being a SAE advisor. However, this construct differs slightly as five of them have a higher percentage of teachers reporting that they are good at performing these behaviors (Table 4.14). One item, increasing the student knowledge about SAE project management, remained true to the original trend of a majority of teachers reporting to be very good at performing the behavior. This item had the highest mean at 3.28 (SD=1.030) (Table 4.14).

In addition to the item level analyses, the individual item scores for this construct were summed to produce a construct score. The scores of the six items of the SAOC construct were totaled for each survey respondent and a mean score determined. A mean summated score was then developed for SAOC. This summated mean for SAOC is 16.22 (SD=4.87) (Table 4.16).

Table 4.14

Agricultural Teacher Self-Efficacy of their role as the SAE Advisor Outside the Traditional Classroom (SAOC): Frequencies and Means (n=402)

			Poor		Fair		Good		Very Good		Excellent	
How well do you execute:	Mean	SD	n	%	n	%	n	%	n	%	n	%
Maintaining relevant SAE programs for students	3.26	1.030	20	5%	70	17.4%	143	35.6%	125	31.1%	44	10.9%
Managing relevant SAE programs for students	3.26	1.030	20	5%	71	17.7%	139	34.6%	128	31.8%	43	10.7%
Maintaining logistics involved with SAE	3.19	1.013	23	5.7%	72	17.9%	147	36.6%	126	31.3%	34	8.5%
Making SAE requirements understood by students	3.26	1.051	22	5.5%	71	17.7%	137	34.1%	126	31.3%	46	11.4%
Increasing the student knowledge about SAE project management	3.28	1.030	21	5.2	70	17.4%	125	31.1%	146	36.3%	39	9.7%

Note: n's vary slightly due to missing data

Scores for the items in their respective categories were summated to create a score for each category for the purpose of construct-level statistical analysis. The possible scores for the categories are explained in Table 4.15. The lowest score for a survey participant in any of the constructs was based on the number of items per category multiplied the lowest choice on the 5-point Likert scale. For example ISTC, MTC, SETC, and SEOC all have 6 items, so the lowest possible score was a 6. Means were then developed for the summated scores (Table 4.16).

Table 4.15

Possible Summated Scores for Self-Efficacy Categories

Categories	Items per Category	Possible Score Range
ISTC	6	6-30
MTC	6	6-30
SETC	6	6-30
FAOC	8	8-40
SAOC	5	5-25
SEOC	6	6-30
SSOC	7	5-35

Table 4.16

Means and Cronbach Alpha Scores for Constructs

Constructs	Number of Items	M (SD)	α	α (Pilot)
ISTC	6	22.81 (4.10)	.886	.872
MTC	6	22.65 (4.10)	.909	.913
SETC	6	21.30 (3.92)	.884	.859
FAOC	8	30.44 (5.91)	.919	.915
SAOC	5	16.22 (4.87)	.970	.947
SEOC	6	22.90 (3.99)	.884	.911
SSOC	7	25.22 (5.19)	.914	.919

Bivariate correlation analyses were conducted on the seven constructs. The findings from these analyses indicated a correlation among all the constructs. None of the correlations were reported to be very strong, the highest was a r=.722, $p < .001$ found for a comparison of SEOC and SSOC. The lowest correlation was found between SAOC and MTC with a r=.355, $p < .001$. Table 4.17 illustrates the relevant statistics from the bivariate correlation analysis further illustrating the relationship between the constructs of teacher self-efficacy of agricultural education teachers.

Table 4.17

Bivariate Correlations Among Teacher Self-Efficacy Constructs

Constructs	MTC	SETC	ISTC	SEOC	SSOC	FAOC	SAOC
MTC	--	.473*	.539*	.362*	.363*	.428*	.355*
SETC		--	.607*	.633*	.488*	.387*	.393*
ISTC			--	.613	.441*	.396*	.374*
SEOC				--	.722*	.527*	.528*
SSOC					--	.656*	.546*
FAOC						--	.668*
SAOC							--

*****Significant $p < .001$ level (2-tailed)

Perceived Teacher Self-Efficacy Beliefs of Traditionally and Alternatively Certified Agricultural Science Education Teachers

The second question of this study involved the impact of the type of certification teachers obtained on their perceived teacher self-efficacy beliefs. More specifically this study was to identify any differences in the perceived teacher self-efficacy of those who obtained certification to teach agricultural education via traditional education route as compared to those who obtained their certification via the alternative certification route. Table 4.18 shows the means and standard deviations of the construct scores for teachers who were either traditionally certified or alternatively certified. While those who were traditionally certified scored their efficacy slightly higher for all constructions, it was not enough to be considered statistically significant. A one-way ANOVA was conducted to test the differences between the two routes. The assumption of equal variance among groups was confirmed with a negative Levene's Test.

Table 4.18

Means of Construct Scores of Traditionally and Alternatively Certified Agricultural Education Teachers

Construct	Traditionally Certified M (SD)	Alternatively Certified M (SD)	F	Sig.
ISTC	22.82 (4.06)	22.80 (4.69)	.001	.977
MTC	22.73 (4.06)	21.93 (4.59)	1.036	.309
SETC	21.30 (3.90)	21.30 (4.21)	.000	.995
FAOC	30.49 (5.95)	30.20 (5.27)	.066	.797
SAOC	16.24 (4.90)	16.07 (4.62)	.034	.854
SEOC	22.93 (3.98)	22.60 (4.38)	.188	.665
SSOC	25.28 (5.22)	24.63 (4.87)	.435	.510

Personal and Situational Characteristics Impact the Perceived Teacher Self-Efficacy Beliefs of Agricultural Science Education Teachers

The third question guiding this study was to what extent did the personal and situational characteristics impact the perceived teacher self-efficacy beliefs of agricultural science education teachers. This study looked specifically to see if personal characteristics such as age, experience teaching, and others were predictive of teachers' self-efficacy in ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC.

The Predictability of Teacher Self-Efficacy by Personal and Situational Characteristics

The findings from multiple linear regression analysis of the personal and situational characteristics and teacher self-efficacy construct MTC indicated some predictability by two of the characteristics. Youth FFA membership, a personal characteristic, provided evidence at the α=.05 level, $F(7, 387)=5.036$, $p < .001$. In addition the adjusted R square value of .067 demonstrated that personal characteristic youth FFA membership explained 6.7% of the variation in MTC. School Resources, a situational characteristic, provided evidence of predictability at the α=.05 level, $F(3, 388)=10.054$, $p < .001$. Additionally, the adjusted R square value of .065 indicated this situational characteristic explains 6.5% of the variation of MTC. Table 4.19 illustrates the relevant statistics from the multiple regression model, further demonstrating the relationship between each personal and situational characteristic and teacher self-efficacy construct MTC.

Table 4.19

Multiple Linear Regression Analysis of Personal and Situational Characteristics and Teacher Self-Efficacy Construct MTC (N=402)

Characteristic Type	Explanatory Variable	*Beta*	*t*	*Sig.*
Personal	Age	.109	1.152	.250
	Years Teaching	.128	1.380	.168
	Undergraduate Degree	-.002	-.037	.971
	Academic Level Certified	-.082	-1.291	.198
	Highest Education Level	.088	1.696	.091
	Youth FFA Member	.106	2.059	.040*
	Second Career	.008	.138	.891
Situational	School Resources	.120	2.270	.024*
	School Support	.114	1.657	.098
	Supervisor Support	.103	1.534	.126

*Significant at $p < .05$ level

The findings from the multiple linear regression of personal and situational characteristics and the teacher self-efficacy construct SETC provides no evidence to conclude that any of the personal characteristics reliably predicted the SETC construct at α=.05, $F(7, 387)$=.514, p=.824. Furthermore, the adjusted R square value of .009 demonstrated that personal characteristics explained 0.9% of the variation in SETC. The findings for the analysis done on the situational characteristics also provided no evidence of predictability of situational characteristics of the SETC construct at the α=.05 level,

$F(3, 388)=2.372$, $p=.070$. Additionally, the adjusted R square value of .010 explained 1% of the variation of SETC. Table 4.20 illustrates the relevant statistics from the multiple regression models, further demonstrating the relationship between each personal and situational characteristic and teacher self-efficacy construct SETC.

Table 4.20

Multiple Linear Regression Analysis of Personal and Situational Characteristics and Teacher Self-Efficacy Construct SETC (N=402)

Characteristic Type	Explanatory Variable	*Beta*	*t*	*Sig.*
Personal	Age	.081	-.821	.412
	Years Teaching	.135	1.401	.162
	Undergraduate Degree	-.026	-.377	.706
	Academic Level Certified	-.013	-.201	.841
	Highest Education Level	-.004	-.072	.943
	Youth FFA Member	.044	.822	.412
	Second Career	-.048	-.798	.425
Situational	School Resources	-.006	-.103	.918
	School Support	.108	1.532	.126
	Supervisor Support	.037	.531	.595

Multiple linear regression analyses were conducted on the personal and situation characteristics of the teacher self-efficacy construct ISTC. The findings from the analyses provided no evidence to conclude that any of the personal characteristics reliably predicted ISTC at the α=.05 level, $F(7, 387)=1.573$, p=.142. In additions the adjusted R square value of .010 demonstrated that personal characteristic variables explained 1% of the variation in ISTC. The findings for the situational characteristics indicated that one of these variables could reliably predict ISTC at the α=.05 level, $F(3, 388)=7.415$, $p < .001$. In addition, the adjusted R square value was .047 that demonstrated that the situational characteristic, supervisor support explained 4.7% of the variation in ISTC. Table 4.21 illustrates the relevant statistics from the multiple regression models, further demonstrating the relationship between each personal and situational characteristic and teacher self-efficacy construct ISTC.

Table 4.21

Multiple Linear Regression Analysis of Personal and Situational Characteristics and Teacher Self-Efficacy Construct ISTC (N=402)

Characteristic Type	Explanatory Variable	*Beta*	*t*	*Sig.*
Personal	Age	-.002	-.020	.984
	Years Teaching	.071	.743	.458
	Undergraduate Degree	-.016	-.244	.807
	Academic Level Certified	-.017	-.258	.796
	Highest Education Level	.103	1.923	.055
	Youth FFA Member	.094	1.776	.077
	Second Career	-.034	-.580	.563
Situational	School Resources	.072	1.349	.178
	School Support	.037	.537	.592
	Supervisor Support	.171	2.519	.012*

*Significant at p < .05 level

The findings from multiple linear regression analysis of the personal characteristics and SEOC indicated no evidence that any of the personal characteristics predicted SEOC at the α=.05 level, $F(7, 387)=.505$, $p=.830$. Also the adjusted R square value was .009 that demonstrated the predictability of the personal characteristics explained 0.9% of the variation in SEOC. The findings for the analysis of the situational characteristics and SEOC provide evidence of one variable reliably predicting SEOC. School Support was found to predict at the α=.05 level, $F(3, 388)=3.052$, $p=.028$. In addition the adjusted R square value of .015 that demonstrates that school support explains 1.5% of the variations in SEOC. Table 4.22 illustrates the relevant statistics from the multiple regression models, further demonstrating the relationship between each personal and situational characteristic and teacher self-efficacy construct SEOC.

Table 4.22

Multiple Linear Regression Analysis of Personal and Situational Characteristics and Teacher Self-Efficacy Construct SEOC (N=402)

Characteristic Type	Explanatory Variable	*Beta*	*t*	*Sig.*
Personal	Age	.002	.016	.987
	Year Teaching	.054	.555	.579
	Undergraduate Degree	.040	.584	.560
	Academic Level Certified	-.068	-1.030	.304
	Highest Education Level	.055	1.017	.310
	Youth FFA Member	-.015	-.273	.785
	Second Career	-.013	-.212	.837
Situational	School Resources	-.007	.143	-.132
	School Support	.143	2.022	.044*
	Supervisor Support	.016	.237	.813

*Significant at p < .05 level

The findings from multiple linear regression analysis of the personal characteristics and SSOC indicated no evidence that any of the personal characteristics predicted SEOC at the α=.05 level, $F(7, 387)$=.1.330, p=.235. Also the adjusted R square value was .006 that demonstrated the predictability of the personal characteristics explained 0.6% of the variation in SSOC. The findings for the analysis of the situational characteristics and SSOC provide evidence of one variable reliably predicting SSOC. School Support was found to predict at the α=.05 level, $F(3, 388)=7.450$, p <.001. In addition the adjusted R square value of .047 that demonstrates that school support explains 4.7% of the variations in SEOC. Table 4.23 illustrates the relevant statistics from the multiple regression models, further demonstrating the relationship between each personal and situational characteristic and teacher self-efficacy construct SSOC.

Table 4.23

Multiple Linear Regression Analysis of Personal and Situational Characteristics and Teacher Self-Efficacy Construct SSOC (N=402)

Characteristic Type	Explanatory Variable	*Beta*	*t*	*Sig.*
Personal	Age	-.057	-.583	.560
	Year Teaching	.131	1.365	.173
	Undergraduate Degree	.069	1.022	.308
	Academic Level Certified	-.126	-1.914	.056
	Highest Education Level	.012	.227	.821
	Youth FFA Member	-.064	-1.218	.224
	Second Career	-.011	-.186	.853
Situational	School Resources	.032	.604	.546
	School Support	.280	4.037	.000*
	Supervisor Support	-.109	-1.601	.110

*Significant at $p < .05$ level

Multiple linear regression analyses were conducted on the personal and situation characteristics of the teacher self-efficacy construct FAOC. The findings from the analyses provided evidence to conclude that three of the personal characteristics reliably predicted FAOC at the α=.05 level, $F(7, 387)=2.869$, p=.006. In additions the adjusted R square value of .032 demonstrated that personal characteristic variables, Academic level certification was obtained, highest education level obtained, and youth FFA member, explained 3.2% of the variation in FAOC. The findings for the situational characteristics indicated that these variables could reliably predict FAOC at the α=.05 level, $F(3, 388)=2.992$, p=.031. In addition, the adjusted R square value was .015 that demonstrated that the situational characteristic, supervisor support explained 1.5% of the variation in FAOC. Further exploration of the analysis indicated that none of the characteristics were actually significant predictors of FAOC. Table 4.24 illustrates the relevant statistics from the multiple regression models, further demonstrating the relationship between each personal and situational characteristic and teacher self-efficacy construct FAOC.

Table 4.24

Multiple Linear Regression Analysis of Personal and Situational Characteristics and Teacher Self-Efficacy Construct FAOC (N=402)

Characteristic Type	Explanatory Variable	*Beta*	*t*	*Sig.*
Personal	Age	-.154	-1.597	.111
	Year Teaching	.102	1.075	.283
	Undergraduate Degree	.092	1.380	.168
	Academic Level Certified	-.136	-2.095	.037*
	Highest Education Level	.125	2.375	.018*
	Youth FFA Member	-.120	-2.294	.022*
	Second Career	.025	.432	.666
Situational	School Resources	.051	.946	.345
	School Support	.092	1.302	.194
	Supervisor Support	.040	.584	.560

*Significant at p < .05 level

Multiple linear regression analyses were conducted on the personal and situation characteristics of the teacher self-efficacy construct SAOC. The findings from the analyses provided no evidence to conclude that any of the personal characteristics reliably predicted ISTC at the α=.05 level, F(7, 387)=1.627, p=.126. In additions the adjusted R square value of .011 demonstrated that personal characteristic variables explained 1.1% of the variation in ISTC. The findings for the situational characteristics indicated that these variables could reliably predict SAOC at the α=.05 level, F(3, 388)=3.567, *p*=.014. In addition, the adjusted R square value was .019 that demonstrated that the situational characteristic, supervisor support explained 1.9% of the variation in SAOC. Further explorations found that none of the situational characteristics were significant in their influence. Table 4.25 illustrates the relevant statistics from the multiple regression models, further demonstrating the relationship between each personal and situational characteristic and teacher self-efficacy construct SAOC.

Table 4.25

Multiple Linear Regression Analysis of Personal and Situational Characteristics and Teacher Self-Efficacy Construct SAOC (N=402)

Characteristic Type	Explanatory Variable	*Beta*	*t*	*Sig.*
Personal	Age	-.168	-1.724	.086
	Year Teaching	.193	2.019	.044*
	Undergraduate Degree	.074	1.099	.273
	Academic Level Certified	-.095	-1.449	.148
	Highest Education Level	.088	1.644	.101
	Youth FFA Member	-.068	1.644	.101
	Second Career	-.045	-.757	.450
Situational	School Resources	.055	1.007	.315
	School Support	.084	.198	.232
	Supervisor Support	.063	.909	.364

*Significant at p < .05 level

Perceived Teacher Self-Efficacy and Age

Teachers were asked to report their birth year, this was then converted to an age and the ages grouped into categories of 20-29 years, 30-39 years, 40-49 years, 50-59 years, and 60+ years of age. A one-way ANOVA was conducted to compare the effect of age to determine if there is a difference in self-efficacy scores based on age group membership on the constructs ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC. Means for the age categories and constructs are seen in Table 4.26. There was a significant difference in MTC scores between age groups at the α=.05 level, $F(4, 395)=7.810$, p=.000, η_p^2=.073. A significant difference was also seen in age level on ISTC scores at the α=.05 level, $F(4, 395)=2.444$, p=.046, η_p^2=.024. The final impact identified at the α=.05 level was the effect of age category on SAOC, $F(4, 395)=2.535$, p=.040, η_p^2=.025. These overall significant impacts are shown in Table 4.27.

Post hoc testing was conducted using Tukey's HSD to determine specific age group differences, if any existed. A Levene's test for equality of variances confirmed that group means did not violate the assumption of homogeneity and an ANOVA could be conducted. These analyses indicated what within the MTC construct, those participants who were in the category 40-49 years with a Mean MTC score of 23.78 (SD=4.101) scored 2.828 points higher than participants that were 20-29 years (M=20.95, SD=3.996). This was a significant difference (p <. 001). This was also observed in the 50-59 years of age category and the 60+ years of age category as compared to the 20-29 years of age category. The participants in the 50-59 years of age category (M=23.60, SD=3.66) outscored the participants in the 20-29 years of age category in the MTC construct by 2.654 points ($p < .001$). Those participants in the 60+ years of age category (M=23.38, SD=3.49) scored MTC construct 2.431points higher than those participants in the 20-29 years of age category.

Table 4.26

Construct Means and Standard Deviation for Age Categories

Construct	20-29 yrs M(SD) n=96	30-39 yrs M(SD) n=102	40-49 yrs M(SD) n=85	50-59 yrs M(SD) n=88	60+ yrs M(SD) n=29
ISTC	21.84 (4.09)	23.44 (4.09)	22.68 (4.37)	22.92 (3.75)	22.83 (4.11)
MTC	20.95 (3.996)	22.30 (4.22)	23.78 (4.10)	23.60 (3.66)	23.38 (3.49)
SETC	20.53 (4.12)	21.99 (4.11)	21.18 (4.06)	21.40 (3.12)	21.24 (4.14)
FAOC	30.57 (5.53)	31.04 (5.96)	31.05 (5.77)	29.14 (5.96)	30.45 (6.82)
SAOC	15.48 (4.66)	16.84 (5.46)	17.25 (4.56)	15.43 (4.33)	16.07 (5.27)
SEOC	22.67 (4.05)	22.94 (4.20)	22.76 (4.33)	22.83 (3.42)	24.10 (3.92)
SSOC	25.10 (5.08)	25.10 (5.53)	25.51 (5.58)	24.59 (4.45)	27.14 (5.10)

Post hoc comparisons using Tukey HSD were used to explore the significant difference amount age groups in the construct of ISTC. Participants in the 30-39 years of age category had a mean ISTC score of 23.44 (SD=4.092) that was 1.597 points higher than the participants of the 20-29 years of age category (M=21.84, SD=4.09). This was found to a statistically significant difference (p=.048).

While there was an overall significant effect at the α=.05 level for SAOC and the age category, further examination of the groups with post hoc comparisons using Tukey HSD indicated no statistical significance between the age categories. The participants in the category 40-49 years of age scored 1.768 points higher in the SAOC construct than the participants in the 20-29 years of age category. However, p=.103 and this did not meet the α=.05 criteria to be statistically significant different.

Table 4.27

One Way Analysis of Variance of Agricultural Education Teacher Self-Efficacy Scores and Age Groups

Construct	Source	*df*	*SS*	*MS*	*F*	*p*
ISTC						
	Between groups	4	162.752	40.688	2.444	.046
	Within Groups	395	6576.808	16.650		
	Total	399	6739.560			
MTC						
	Between groups	4	492.412	12.353	7.810	.001
	Within Groups	395	6238.978	15.795		
	Total	399	6732.390			
SETC						
	Between groups	4	107.438	26.860	1.760	.136
	Within Groups	395	6027.639	15.260		
	Total	399	6135.078			
FAOC						
	Between groups	4	218.897	54.724	1.578	.179
	Within Groups	395	13702.681	34.690		
	Total	399	13921.577			
SAOC						
	Between groups	4	237.197	59.299	2.353	.040
	Within Groups	395	9238.713	23.389		
	Total	399	9475.910			
SEOC						
	Between groups	4	48.936	12.234	.759	.552
	Within Groups	395	6363.064	16.109		
	Total	399	6412.000			
SSOC						
	Between groups	4	151.581	37.895	1.411	.229
	Within Groups	395	10606.717	26.852		
	Total	399	10758.298			

Perceived Teacher Self-Efficacy and Years Teaching Experience

Survey participants were asked to report how long they had been teaching Agricultural Education. This data was then converted into categories of 0-5 years, 6-9 years, 10-14 years, 15-19 years, 20-24 years, and 25+ years. A one-way ANOVA was conducted on the years of experience impact on the constructs ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC. A Levene's test for equality of variances confirmed that the group means did not violate the assumption of homogeneity and an ANOVA could be conducted. There was a significant effect of years' experience on MTC at the α=.05 level , $F(5, 396)=5.602$, $p<.001$, $\eta_p^2=.066$. Years of experience did not have an overall significant impact on ISTC with a $F(5, 396)=2.127$, $p=.061$, but post hoc comparisons were run to explore the possibility of impact between the categories of years of experience. Table 4.28 illustrates the means for years experience and Table 4.29 illustrates the overall impacts within the groups of years experience.

Post hoc comparisons using Tukey HSD indicated that the mean score for MTC of the 15-19 years experience category (M=23.47, SD=3.63) was significantly different than the mean of the 0-5 years experience category (M=21.24, SD=3.95). The 15-19 years experience category scored 2.23 higher in management in the traditional classroom (p=.006). A significant difference was also found between the means of those with 25+ years experience (M=23.95, SD=3.70) and those with 0-5 years experience, with the individuals with 25+ years experience 2.72 points higher in MTC (p < .001).

Post hoc comparisons using Tukey HSD were also conducted to further explore the possibility of significant impact between the years experience categories and ISTC. The one-way ANOVA had indicated no overall effect, but the post hoc comparisons indicated an effect with two of the years experience groups. A significant difference (*p*=.031) was found between the means for those participants of the 10-14 years experience (M=24.04, SD=4.06) and participants of the 0-5 years experience (M=21.97, SD=3.97). Those with 10-14 years experience were found to score 2.08 points higher than those with 0-5 years in ISTC.

Table 4.28

Construct Means and Standard Deviations of Years Teaching Experience

Construct	0-5 years M(SD) n=123	6-9 years M(SD) n=59	10-14 years M(SD) n=50	15-19 years M(SD) n=60	20-24 years M(SD) n=28	25+ years M(SD) n=82
ISTC	21.97 (3.97)	22.80 (4.42)	24.04 (4.06)	22.93 (4.11)	23.32 (4.27)	23.06 (3.88)
MTC	21.24 (3.94)	22.39 (4.46)	23.06 (4.45)	23.47 (3.63)	23.18 (3.77)	23.95 (3.70)
SETC	20.82 (4.03)	21.27 (4.09)	21.56 (4.49)	21.62 (3.84)	21.32 (2.97)	21.62 (3.61)
FAOC	30.06 (5.52)	30.36 (6.61)	30.72 (6.14)	31.65 (5.47)	29.42 (6.72)	30.38 (5.83)
SAOC	15.57 (4.63)	15.81 (5.50)	17.16 (5.25)	16.75 (4.96)	16.39 (4.43)	16.48 (4.52)
SEOC	22.36 (3.99)	23.29 (3.99)	23.02 (4.23)	23.13 (4.48)	22.50 (3.60)	23.33 (3.63)
SSOC	24.72 (5.29)	24.93 (5.38)	24.76 (5.38)	25.92 (5.52)	25.61 (5.02)	25.84 (4.56)

Table 4.29

One Way Analysis of Variance of Agricultural Education Teacher Self-Efficacy Scores and Years Teaching

Construct	Source	*df*	*SS*	*MS*	*F*	*p*
ISTC						
	Between groups	5	176.366	35.273	2.127	.061
	Within Groups	396	6567.885	16.586		
	Total	401	6744.251			
MTC						
	Between groups	5	445.076	89.015	5.602	.001
	Within Groups	396	6291.862	15.889		
	Total	401	6736.938			
SETC						
	Between groups	5	46.157	9.231	.599	.701
	Within Groups	396	6105.617	15.418		
	Total	401	6151.774			
FAOC						
	Between groups	5	139.189	27.838	.796	.553
	Within Groups	396	13843.995	34.960		
	Total	401	13983.184			
SAOC						
	Between groups	5	129.084	25.817	1.092	.364
	Within Groups	396	9366.212	23.652		
	Total	401	9495.296			
SEOC						
	Between groups	5	68.635	13.727	.857	.510
	Within Groups	396	6343.385	16.019		
	Total	401	6412.020			
SSOC						
	Between groups	5	111.760	22.352	.829	.529
	Within Groups	396	10672.090	26.950		
	Total	401	10783.851			

Perceived Teacher Self-Efficacy and Having an Undergraduate Degree in Agricultural Education

Survey participants were asked if they had obtained an undergraduate degree in Agricultural Education. These were categorized by “yes” or “no”. A Levene’s test for equality of variances confirmed that the group means did not violate the assumption of homogeneity and an ANOVA could be conducted. A one-way ANOVA was conducted to compare the impact of having an undergraduate degree in Agricultural Education on constructs ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC. Table 4.30 shows the means and standard deviations of the constructs and having an undergraduate degree in Agricultural Education. There were no overall significant effects to any of the constructs at the $\alpha=.05$ level (Table 4.31). As there were only two groups, post hoc comparisons were not needed.

Table 4.30

Construct Means and Standard Deviations of Undergraduate Degree in Agricultural Education

Construct	Yes M (SD) n=318	No M (SD) n=84
ISTC	22.80 (4.07)	22.84 (4.24)
MTC	22.74 (4.01)	22.37 (4.41)
SETC	21.36 (3.91)	21.05 (3.97)
FAOC	30.58 (5.80)	29.92 (6.28)
SAOC	16.27 (4.91)	16.02 (4.72)
SEOC	22.92 (4.05)	22.83 (3.83)
SSOC	25.35 (5.28)	24.73 (4.82)

Table 4.31

One Way Analysis of Variance of Agricultural Education Teacher Self-Efficacy Scores and Undergraduate Degree in Agricultural Education

Construct	Source	*df*	*SS*	*MS*	*F*	*p*
ISTC						
	Between groups	1	.144	.144	.009	.927
	Within Groups	400	6744.108	16.860		
	Total	401	6744.251			
MTC						
	Between groups	1	8.636	8.636	.513	.474
	Within Groups	400	6728.302	16.821		
	Total	401	6736.938			
SETC						
	Between groups	1	6.552	6.552	.426	.514
	Within Groups	400	6145.221	15.363		
	Total	401	6151.774			
FAOC						
	Between groups	1	29.393	29.393	.843	.359
	Within Groups	400	13953.791	34.884		
	Total	401	13983.184			
SAOC						
	Between groups	1	4.146	4.146	.175	.676
	Within Groups	400	9491.150	23.728		
	Total	401	9495.296			
SEOC						
	Between groups	1	.479	.479	.030	.863
	Within Groups	400	6411.541	16.029		
	Total	401	6412.020			
SSOC						
	Between groups	1	26.302	26.302	.978	.323
	Within Groups	400	10757.548	26.894		
	Total	401	10783.851			

Perceived Teacher Self-Efficacy and Academic Level at which Agricultural Education Certification Obtained

Survey participants were asked to report their academic degree level at which Agricultural Education certification was obtained. Choices provided were Bachelor's Degree, Master's Degree, Alternative Certification, and Other. The category of Other also included a chance to provide what method they obtained their certification, these are included in Appendix G. A Levene's test for equality of variances confirmed that the group means did not violate the assumption of homogeneity and an ANOVA could be conducted. A one-way ANOVA was conducted to compare the effect of academic degree level on ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC. Table 4.32 shows the mean scores of survey participants for the constructs with their academic level of Agricultural Education certification.

Table 4.32

Construct Means and Standard Deviations of Academic Level at Which Agricultural Education Certification Obtained

Construct	Bachelor's Degree M (SD) n=317	Master's Degree M (SD) n=49	Alternative Cert. M (SD) n=30	Other M (SD) n=5
ISTC	22.81 (4.09)	22.86 (3.87)	22.80 (4.69)	23.20 (4.66)
MTC	22.83 (4.02)	21.96 (4.34)	21.93 (4.59)	23.60 (3.21)
SETC	21.43 (3.80)	20.45 (4.49)	21.30 (4.21)	21.80 (3.96)
FAOC	30.87 (5.80)	28.16 (6.14)	30.20 (5.27)	28.80 (9.09)
SAOC	16.48 (4.82)	14.59 (5.16)	16.07 (4.62)	17.00 (4.85)
SEOC	23.93 (3.95)	22.22 (4.14)	22.60 (4.38)	23.60 (3.91)
SSOC	22.58 (5.14)	23.53 (5.26)	24.63 (4.87)	23.40 (7.13)

There was a significant effect of Academic Degree Level for Agricultural Education certification on SSOC at the α=.05 level, $F(3, 397)=2.614$, p=.051, η_p^2=.019 (Table 4.33). Also a significant effect of academic degree level on FAOC at α=.05 level, $F(3, 397)=3.205$, p=.023, η_p^2=.024.

Post hoc comparisons using Tukey HSD were ran on SSOC and the effect of academic level at which Agricultural Education certification was obtained. A significant difference was found in SSOC between the means of those at the Master's Degree level (M=23.53, SD=5.26) and those at the Bachelor's Degree level (M=22.58, SD=5.14). Those who had obtained their certification at the Bachelor's Degree level scored 2.052 points higher (p=.048) than those who had obtained the certification at the Master's Degree level.

Post hoc comparisons using Tukey HSD were also ran on FAOC and effect of academic level at which Agricultural Education certification was obtained. A significant difference was found between the means of those who had obtained certification at the Bachelor's Degree level (M=30.87, SD=5.80) and Master's Degree level (M=28.16, SD=6.14). Those who had obtained the certification at the Bachelor's Degree Level scored 2.71 points (p=.014) higher in the FAOC construct than those who had obtained the certification at the Master's Degree level.

Table 4.33

One Way Analysis of Variance of Agricultural Education Teacher Self-Efficacy Scores and Academic Level at Which Agricultural Education Certification Obtained

Construct	Source	*df*	*SS*	*MS*	*F*	*p*
ISTC						
	Between groups	3	.829	.276	.016	.997
	Within Groups	397	6720.244	16.928		
	Total	400	6721.072			
MTC						
	Between groups	3	53.436	17.812	1.061	.365
	Within Groups	397	6661.786	16.780		
	Total	400	6715.222			
SETC						
	Between groups	3	42.007	14.002	.911	.435
	Within Groups	397	6098.875	15.362		
	Total	400	6140.883			
FAOC						
	Between groups	3	328.549	109.516	3.205	.023
	Within Groups	397	13565.247	34.169		
	Total	400	13893.796			
SAOC						
	Between groups	3	154.980	51.660	2.196	.088
	Within Groups	397	9338.820	23.523		
	Total	400	9493.800			
SEOC						
	Between groups	3	32.724	10.908	.679	.565
	Within Groups	397	6375.675	16.060		
	Total	400	6408.399			
SSOC						
	Between groups	3	208.560	69.520	2.614	.051
	Within Groups	397	10557.405	26.593		
	Total	400	10765.965			

Perceived Teacher Self-Efficacy and Highest Education Level Obtained

Survey participants were asked to report their highest level of education obtained. Respondents responded with one of five choices, including Bachelor's Degree (BS), Master's Degree (MS), Specialist Degree (SpecD), Doctorate Degree (PhD), and Other. Respondents were provided a space to further explain other and these responses are provided in a table in Appendix H. A Levene's test for equality of variances confirmed that the group means did not violate the assumption of homogeneity and an ANOVA could be conducted. A one-way ANOVA was conducted to compare the effect of highest education level obtained on ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC. Means were determined for the constructs at the five level of education (Table 4.34).

Table 4.34

Construct Means and Standard Deviations of Highest Academic Level Obtained

Construct	BS M(SD) n=189	MS M(SD) n=186	SpecD M(SD) n=13	PhD M(SD) n=8	Other M(SD) n=5
ISTC	22.24 (3.99)	23.21 (4.12)	23.45 (3.80)	25.88 (4.32)	21.40 (4.39)
MTC	22.08 (4.23)	23.05 (4.00)	23.38 (2.66)	24.13 (3.44)	23.80 (1.71)
SETC	21.22 (3.73)	21.37 (4.06)	20.15 (4.08)	23.74 (3.49)	19.60 (5.03)
FAOC	29.90 (5.82)	30.73 (5.90)	31.15 (5.41)	36.13 (5.08)	27.40 (1.18)
SAOC	15.85 (4.97)	16.39 (4.74)	17.31 (4.25)	18.88 (5.54)	15.20 (4.15)
SEOC	22.74 (3.83)	22.86 (4.08)	24.38 (3.86)	25.00 (5.68)	21.80 (3.42)
SSOC	25.30 (5.02)	24.99 (5.17)	25.69 (5.84)	30.25 (5.47)	20.80 (5.93)

There was significant effect of highest education level obtained on ISTC at the α=05 level, $F(4, 396)=2.767$, $p=.027$, $\eta_p^2=.027$ (Table 4.35). There was also a significant effect of highest education level obtained on SSOC, $F(4, 396)=2.977$, $p=.019$, $\eta_p^2=.029$.

Likewise, an overall significant effect of highest education level obtained on FAOC, $F(4, 396)=2.788$, $p=.026$, $\eta_p^2=.027$. These three constructs, ISTC, SSOC, and FAOC, were further explored with post hoc comparisons.

Table 4.35

One Way Analysis of Variance of Agricultural Education Teacher Self-Efficacy Scores and Highest Academic Level Obtained

Construct	Source	*df*	*SS*	*MS*	*F*	*p*
ISTC						
	Between groups	4	181.990	45.497	2.767	.027
	Within Groups	396	6510.414	16.440		
	Total	400	6692.404			
MTC						
	Between groups	4	122.819	30.705	1.854	.118
	Within Groups	396	6560.024	16.566		
	Total	400	6682.843			
SETC						
	Between groups	4	81.392	20.348	1.332	.257
	Within Groups	396	6048.199	15.273		
	Total	400	6129.591			
FAOC						
	Between groups	4	380.547	95.137	2.788	.026
	Within Groups	396	13511.069	34.119		
	Total	400	13891.616			
SAOC						
	Between groups	4	107.615	26.904	1.144	.335
	Within Groups	396	13511.069	23.511		
	Total	400	13891.616			
SEOC						
	Between groups	4	74.952	18.738	1.180	.319
	Within Groups	396	6286.539	15.875		
	Total	400	6361.491			
SSOC						
	Between groups	4	314.125	78.531	2.977	.019
	Within Groups	396	10446.857	26.381		
	Total	400	10760.983			

Post hoc comparisons using Tukey HSD was conducted and no significant differences were found between the groups in ISTC. Those that had obtained a Doctorate

Degree (M=25.88, SD=4.32) scored 3.64 points than those who had obtain a Bachelor's Degree (M=22.24, SD=3.99), however *p*=.096 and this did not meet the α=.05 level.

Comparisons conducted for SSOC resulted in a different trend, significant differences were found between the academic levels. Those with a Doctorate Degree (M=30.25, SD=5.47) scored 5.26 points higher in SSOC than those who had obtained a Master's Degree (M=24.99, SD=5.17). This was found to be significant with a p value of .038. Those with the Doctorate were also found to outscore in SSOC by 9.45 points those who indicated their highest degree level as Other (M=20.80, SD=5.93), and this was found to be significant (*p*=.019).

Post hoc comparison using Tukey HSD for FAOC did indicate a significant effect between to academic levels. Those who had obtained doctorate (M=36.14, SD=5.08) outscored those who had proceeded no further than a Bachelor's Degree (M=29.90, SD=5.82) by 6.22 points (*p*=.028).

Perceived Teacher Self-Efficacy and Youth FFA Member

Survey participants were asked to indicate their involvement as a FFA member. A simple yes/no question regarding membership in FFA as a middle or high school student was answered. A Levene's test for homogeneity confirmed that the group means did not violate the assumption of homogeneity and an ANOVA could be conducted. A one-way ANOVA was conducted to compare the effect of the individual being a youth member of FFA and ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC. Table 4.36 lists the mean scores for constructs and youth membership in FFA. A significant effect was seen in the MTC scores, $F(1, 398)=4.320$, $p=.038$, $\eta_p^2=.011$ (Table 4.37). Those who indicated that they had been a member of FFA as a youth had a MTC mean score of

22.44 (SD=4.21) while those who were not members of FFA as youth had a mean MTC score of 23.49 (SD=3.57).

A significant effect was also observed in the FAOC construct, $F(1, 398)=2.26$, $p=.011$, $\eta_p^2=.016$. Those who had been members of FFA as a youth had a mean FAOC score of 30.79 (SD=5.74). Those who had not been a member of FFA as a youth had a mean FAOC of 28.93 (SD=6.29). No other overall significant effects were observed and with only two groups, the yes or the no group, Post hoc comparisons could not be conducted.

Table 4.36

Construct Means and Standard Deviations of Youth FFA Member

Construct	Yes M (SD) n=319	No M (SD) n=81
ISTC	22.61 (4.08)	23.52 (4.11)
MTC	22.44 (4.21)	23.49 (3.57)
SETC	21.24 (3.94)	21.47 (3.86)
FAOC	30.79 (5.74)	28.93 (6.29)
SAOC	16.39 (4.64)	15.48 (5.61)
SEOC	22.92 (3.90)	22.78 (4.35)
SSOC	25.40 (5.18)	24.49 (5.10)

Table 4.37

One Way Analysis of Variance of Agricultural Education Teacher Self-Efficacy Scores and Youth FFA Member

Construct	Source	*df*	*SS*	*MS*	*F*	*p*
ISTC						
	Between groups	1	53.906	53.906	3.232	0.73
	Within Groups	398	6638.454	16.680		
	Total	399	6692.360			
MTC						
	Between groups	1	72.320	72.320	4.320	.038
	Within Groups	398	6662.680	16.740		
	Total	399	6735.000			
SETC						
	Between groups	1	3.538	3.538	.230	.632
	Within Groups	398	6133.540	15.411		
	Total	399	6137.077			
FAOC						
	Between groups	1	223.700	223.700	6.520	.011
	Within Groups	398	13655.060	34.309		
	Total	399	13878.760			
SAOC						
	Between groups	1	53.168	53.168	2.261	.133
	Within Groups	398	9360.022	23.518		
	Total	399	9413.190			
SEOC						
	Between groups	1	1.223	1.223	.077	.782
	Within Groups	398	6356.715	15.972		
	Total	399	6357.938			
SSOC						
	Between groups	1	52.459	52.459	1.968	.161
	Within Groups	398	10608.479	26.654		
	Total	399	10660.937			

Perceived Teacher Self-Efficacy and Agricultural Education as Second Career

Survey participants were asked if becoming an Agricultural Educator was a second career. They were provided an opportunity to share what their first career was if they indicated that becoming an agricultural education teacher was a second career. A list of their first careers is provided in a table in Appendix I. A Levene's test for equality of variances confirmed that the group means did not violate the assumption of homogeneity and an ANOVA could be conducted. A one-way ANOVA was conducted to compare the effect of teaching Agricultural Education as a second career on the constructs ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC. Means for the construct scores and Agricultural Education as a second career are reported in Table 4.38. No significant effect was found for any of the constructs (Table 4.39).

Table 4.38

Construct Means and Standard Deviations of Agricultural Education as Second Career

Construct	Yes M (SD) n=75	No M (SD) n=326
ISTC	23.00 (4.04)	22.75 (4.11)
MTC	22.59 (3.97)	22.66 (4.14)
SETC	21.36 (4.12)	21.25 (3.85)
FAOC	29.28 (6.49)	30.70 (5.75)
SAOC	15.96 (4.60)	16.25 (4.91)
SEOC	22.88 (3.78)	22.89 (4.05)
SSOC	24.81 (5.00)	25.30 (5.22)

Table 4.39

One Way Analysis of Variance of Agricultural Education Teacher Self-Efficacy Scores and Agricultural Education as 2nd Career

Construct	Source	*df*	*SS*	*MS*	*F*	*p*
ISTC						
	Between groups	1	3.952	3.952	.235	.628
	Within Groups	399	6701.868	16.797		
	Total	400	6075.820			
MTC						
	Between groups	1	.351	.351	.021	.885
	Within Groups	399	6731.070	16.870		
	Total	400	6731.421			
SETC						
	Between groups	1	.677	.677	.044	.833
	Within Groups	399	6075.148	15.226		
	Total	400	6075.825			
FAOC						
	Between groups	1	122.839	122.839	3.539	.061
	Within Groups	399	13847.660	34.706		
	Total	400	13970.499			
SAOC						
	Between groups	1	5.292	5.292	.224	.636
	Within Groups	399	9412.748	23.591		
	Total	400	9418.040			
SEOC						
	Between groups	1	.003	.003	.000	.990
	Within Groups	399	6374.721	15.977		
	Total	400	6374.723			
SSOC						
	Between groups	1	14.296	14.296	.532	.466
	Within Groups	399	10723.525	26.876		
	Total	400	10737.820			

Perceived Teacher Self-Efficacy and Situational Characteristic School Resources

Survey participants were asked to self-report on the situational characteristic of school resources. Three questions were used to gauge how the teachers perceived the resources provided to them. Resources included equipment needs, space, and funding needs. Scores were summed for the three questions to get an overall score for school support in resources. These overall scores ranged from three (no support) to nine (enough support).

A one-way ANOVA was conducted to compare the self-reported school support effect on ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC. The construct means for the summed school support scores are provided in Table 4.40. A significant effect was identified at the $\alpha=.05$ level for MTC, $F(3, 392)=2.951$, $p=.008$, $\eta_p^2=.043$ and a possible significant effect for SSOC, $F(3, 392)=2.112$, $p=.051$, $\eta_p^2=.031$ (Table 4.41). MTC and SSOC were further examined using Post hoc comparisons with Tukey HSD. In the MTC construct, those who had scored their school resource provisions as a "9" (M=23.95, SD=3.71) outscored those who had scored their school resource provision a "6" (M=21.80, SD=4.14). This was significant with a *p* value of .003. When SSOC was further explored using the Post hoc comparison using Tukey HSD, no significant differences occurred between the groups of School Resources scores.

Table 4.40

Construct Means and Standard Deviations of Situational Characteristic School Resources

Construct	3 M(SD) n=6	4 M(SD) n=5	5 M(SD) n=30	6 M(SD) n=123	7 M(SD) n=76	8 M(SD) n=67	9 M(SD) n=92
ISTC	23.67 (2.25)	20.80 (3.70)	20.87 (6.29)	22.58 (4.12)	22.89 (3.36)	23.54 (3.86)	23.32 (4.09)
MTC	21.67 (2.58)	20.40 (2.61)	21.93 (4.34)	21.80 (4.14)	22.70 (4.13)	22.96 (4.25)	23.95 (3.71)
SETC	22.50 (2.07)	20.20 (7.26)	19.67 (5.01)	21.53 (4.01)	21.07 (3.32)	21.87 (3.51)	21.26 (3.87)
FAOC	29.33 (8.52)	27.80 (7.46)	30.00 (6.57)	29.67 (5.66)	30.54 (4.99)	31.46 (6.18)	30.92 (6.21)
SAOC	17.50 (5.24)	15.20 (4.71)	15.77 (5.62)	15.92 (4.59)	14.97 (4.69)	17.07 (4.77)	17.13 (4.96)
SEOC	21.83 (4.36)	21.00 (4.18)	22.73 (4.86)	22.94 (4.37)	22.63 (3.40)	23.52 (3.83)	22.82 (3.84)
SSOC	20.33 (5.01)	20.00 (6.89)	25.36 (5.53)	25.09 (5.41)	25.05 (5.05)	26.06 (4.70)	25.40 (4.92)

Table 4.41

One Way Analysis of Variance of Agricultural Education Teacher Self-Efficacy Scores and Situational Characteristic School Resources

Construct	Source	*df*	*SS*	*MS*	*F*	*p*
ISTC						
	Between groups	6	203.793	33.966	2.058	0.57
	Within Groups	392	6427.040	16.503		
	Total	398	6717.323			
MTC						
	Between groups	6	290.283	48.381	2.951	.008
	Within Groups	392	6427.040	16.396		
	Total	398	6717.323			
SETC						
	Between groups	6	126.873	21.146	1.399	.214
	Within Groups	392	5925.818	15.117		
	Total	398	6052.692			
FAOC						
	Between groups	6	213.791	35.632	1.024	.409
	Within Groups	392	13635.472	34.784		
	Total	398	13849.263			
SAOC						
	Between groups	6	275.601	45.933	1.978	.068
	Within Groups	392	9103.863	23.224		
	Total	398	9379.464			
SEOC						
	Between groups	6	58.018	9.670	.597	.733
	Within Groups	392	6351.561	15.203		
	Total	398	6409.579			
SSOC						
	Between groups	6	334.570	55.762	2.112	.051
	Within Groups	392	10347.986	27.398		
	Total	398	10682.556			

Perceived Teacher Self-Efficacy and Situational Characteristic School Support

Survey participants were asked to self-report on the situational characteristic of school support. Three questions were used to gauge how the teachers perceived the support of the school. School support was separated into agricultural education program, FFA activities, and SAE activities. Scores were summed for the three questions to get an overall score for school support. These overall scores ranged from three (no support) to nine (enough support).

One-way ANOVA was conducted to compare the self-reported school support effect on ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC. A Levene's test for equality of variances confirmed that the group means did not violate the assumption of homogeneity and an ANOVA could be conducted. The means for school support and constructs is reported in Table 4.42. A significant effect was identified at the α=.05 level for ISTC, $F(6, 392)=2.674$, p=.015, η_p^2=.039; MTC, $F(6, 392)=4.012$, p=.001), η_p^2=.058; SEOC, $F(6, 392)=2.431$, p=.026, η_p^2=.036 and SSOC, $F(6, 392)=4.091$, p=.001, η_p^2=.059. Two of the constructs were very close to the $p < .05$ level criteria, FAOC, $F(6, 392)=2.102$, p=.052, η_p^2=.031 and SAOC, $F(6, 392)=2.068$, p=.056, η_p^2=.031. These two constructs as well as the ones who were found to be significant were further explored using Post hoc comparisons. Table 4.43 shows all the one-way ANOVA results.

Post hoc comparisons using Tukey HSD were conducted on the constructs to identify any differences of the means with in the score groups. No significant differences in the means were identified for the School Support Scores for ISTC or SEOC. There were significant differences in means identified for MTC. Teachers who scored their school support a "9" (M=23.60, SD=4.10) scored MTC 3.036 points higher than those participants who scored their school support a “5” (M=20.56, SD=4.43). This was found to be a significant difference in means at the α=.05 level (p=.012). A significant differences in means in MTC was also found between the participants who scored their school a “9” and those who scored their school a “6” (M=22.00, SD=3.88). Those who scored their school support a “9” scored MTC 1.601 points higher than those who scored the school support a “6”, this was found to be significant at the α=.05 level (p=.016). Differences in means were also found in SSOC. As seen in the MTC grouping, those who scored their school support a “9” (M=26.53, SD=4.80) in SSOC outscored those who scored their school support a “6” (M=24.47, SD=5.52) by 2.064 points (p=.013).

Table 4.42

Construct Means and Standard Deviations of Situational Characteristic School Support

Construct	3 M(SD) n=7	4 M(SD) n=4	5 M(SD) n=23	6 M(SD) n=115	7 M(SD) n=30	8 M(SD) n=42	9 M(SD) n=178
ISTC	22.57 (3.60)	19.50 (6.45)	21.48 (4.65)	22.21 (3.89)	22.73 (4.27)	22.12 (3.77)	23.62 (4.08)
MTC	21.71 (2.63)	18.50 (6.86)	20.56 (4.43)	22.00 (3.88)	22.47 (3.70)	22.40 (3.87)	23.60 (4.10)
SETC	21.00 (4.65)	19.50 (1.29)	20.91 (3.86)	20.88 (4.09)	20.63 (4.34)	20.52 (3.31)	21.93 (3.84)
FAOC	28.42 (5.65)	27.75 (5.85)	28.52 (6.83)	30.19 (5.66)	30.07 (4.75)	28.83 (5.68)	26.53 (4.80)
SAOC	15.43 (5.16)	15.75 (6.13)	14.60 (5.56)	15.87 (4.92)	15.57 (4.30)	14.97 (3.95)	17.08 (4.88)
SEOC	21.57 (5.38)	23.75 (4.79)	22.26 (4.64)	22.35 (4.12)	22.20 (3.93)	21.90 (3.75)	23.69 (3.74)
SSOC	21.43 (7.93)	25.25 (5.31)	24.13 (5.67)	24.47 (5.52)	23.63 (4.51)	24.05 (4.40)	26.53 (4.80)

Table 4.43

One Way Analysis of Variance of Agricultural Education Teacher Self-Efficacy Scores and Situational Characteristic School Support

Construct	Source	*df*	*SS*	*MS*	*F*	*p*
ISTC						
	Between groups	6	264.643	44.107	2.674	.015
	Within Groups	392	6465.497	16.494		
	Total	398	6730.140			
MTC						
	Between groups	6	387.985	64.664	4.012	.001
	Within Groups	392	6318.346	16.118		
	Total	398	6706.331			
SETC				24.324	1.596	.147
	Between groups	6	145.946	15.241		
	Within Groups	392	5974.615			
	Total	398	6120.561			
FAOC						
	Between groups	6	435.000	72.500	2.102	.052
	Within Groups	392	13521.245	34.493		
	Total	398	13956.246			
SAOC						
	Between groups	6	288.088	48.015	2.068	.056
	Within Groups	392	9102.228	23.220		
	Total	398	9390.316			
SEOC						
	Between groups	6	227.286	37.881	2.431	.026
	Within Groups	392	6109.411	15.585		
	Total	398	6336.697			
SSOC						
	Between groups	6	633.144	105.524	4.091	.001
	Within Groups	392	10110.886	25.793		
	Total	398	10744.030			

Perceived Teacher Self-Efficacy and Situational Characteristic Supervisor Support

Survey participants were asked to self-report on the situational characteristic of supervisor support. Three questions were used to gauge how the teachers perceived the support of their supervisor. Supervisor support was differentiated into how the teacher perceives the support of the supervisor of them as an agricultural education teacher, FFA advisor, and SAE advisor. Scores were summed for the three questions to get an overall score for supervisor support. These overall scores ranged from three (no support) to nine (enough support).

A one-way ANOVA was conducted to compare the teacher self-reported perception of their supervisor support to ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC. A Levene's test for equality of variances confirmed that the group means did not violate the assumption of homogeneity and an ANOVA could be conducted. Means are reported in Table 4.44. A significant effect was identified at the α=.05 level for ISTC, $F(6, 391)=4.669$, $p < .001$, $\eta_p^2=.067$; MTC, $F(6, 391)=4.250$, $p < .001$, $\eta_p^2=.061$; FAOC, $F(6, 391)=2.190$, $p=.043$, $\eta_p^2=.033$; and SAOC, $F(6, 391)=2.154$, $p=.047$, $\eta_p^2=.032$, as seen in Table 4.45. Further investigations with post hoc comparison using Tukey HSD indicated some differences within the group means.

A significant difference was found with the group means of MTC for those who scored their supervisor support a "9" (M=23.55, SD=4.03) as compared to those that scored their supervisor support a "4" (M=18.75, SD=5.23). Those that scored their supervisor support a "9" scored 4.80 points higher than those only scoring the support a "4", this was significantly different (*p*=.016). A significant difference in means was also found between groups in ISTC. Survey participants who reported their supervisor support to be a “9” (M=23.66, SD=3.87) scored 4.66 points higher in ISTC than those that scored their supervisor support to be a “4” (M=19.00, SD=4.93), this was significantly different (*p*=.021). There was also a statistical difference (p=.011) between those that scored their supervisor support a “7” (M=20.97, SD=3.68) as compared to those that scored their supervisor support a “9”, those scoring their supervisor support higher were found to score 2.69 points higher in ISTC. Post hoc comparisons using Tukey HSD found no statistical differences in the group means for FAOC or SAOC at the $p < .05$ level.

Table 4.44

Construct Means and Standard Deviations of Situational Characteristic Supervisor Support

Construct	3 M(SD) n=12	4 M(SD) n=8	5 M(SD) n=20	6 M(SD) n=83	7 M(SD) n=30	8 M(SD) n=51	9 M(SD) n=194
ISTC	21.17 (4.97)	19.00 (4.93)	21.30 (3.73)	22.69 (4.25)	20.97 (3.68)	22.51 (3.75)	23.66 (3.87)
MTC	20.50 (3.85)	18.75 (5.23)	22.40 (3.60)	22.14 (4.13)	21.40 (3.62)	22.45 (3.68)	23.55 (4.03)
SETC	21.00 (4.47)	19.88 (2.70)	20.45 (2.86)	21.24 (4.28)	19.833 (3.67)	21.02 (3.45)	21.81 (3.97)
FAOC	32.35 (5.75)	29.75 (7.70)	28.50 (5.96)	29.64 (5.61)	28.37 (5.49)	30.12 (5.29)	31.39 (5.86)
SAOC	17.42 (4.40)	14.75 (5.55)	14.45 (4.82)	15.51 (5.16)	14.80 (4.04)	16.14 (4.43)	16.94 (4.85)
SEOC	23.92 (3.82)	21.25 (3.28)	22.65 (4.77)	22.22 (4.41)	21.80 (4.05)	22.51 (3.19)	23.50 (3.83)
SSOC	26.67 (6.81)	25.13 (5.49)	24.35 (4.86)	24.51 (5.62)	23.37 (5.88)	24.75 (4.20)	25.96 (4.92)

Table 4.45

One Way Analysis of Variance of Agricultural Education Teacher Self-Efficacy Scores and Situational Characteristic Supervisor Support

Construct	Source	*df*	*SS*	*MS*	*F*	*p*
ISTC						
	Between groups	6	441.995	73.666	4.669	.000
	Within Groups	391	6168.980	15.777		
	Total	397	6610.975			
MTC						
	Between groups	6	403.131	67.188	4.250	.000
	Within Groups	391	6181.475	15.809		
	Total	397	6584.606			
SETC						
	Between groups	6	151.894	25.316	1.664	.128
	Within Groups	391	5947.472	15.211		
	Total	397	6099.367			
FAOC						
	Between groups	6	448.322	74.720	2.190	.043
	Within Groups	391	13338.173	34.113		
	Total	397	13786.495			
SAOC						
	Between groups	6	298.911	49.819	2.154	.047
	Within Groups	391	9044.187	23.131		
	Total	397	9343.098			
SEOC						
	Between groups	6	188.070	31.345	2.015	.063
	Within Groups	391	6083.108	15.558		
	Total	397	6271.178			
SSOC						
	Between groups	6	304.495	50.749	1.923	.076
	Within Groups	391	10316.239	26.384		
	Total	397	10620.734			

Relationships between Perceived Teacher Self-Efficacy Beliefs and Outcomes

The fourth question guiding this study involved the identification of a relationship between teacher self-efficacy constructs ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC and identified outcomes. Earlier analysis identified relationships between recognized personal and situational characteristics. This work will see if the teacher self-efficacy scores are indicative of the self-reported outcomes of those surveyed. Outcomes that were measured for this study are innovative teaching, job satisfaction, program impacts, and teacher retention.

Relationship between Outcome Innovative Teaching and Self-Efficacy

Survey respondents were asked to self-report on their use of innovative teaching. Three questions were used to gauge whether teachers used to gauge how often teachers used innovative teaching (never, sometimes, or always). These scores for each item were summed into a score to represent Innovative Teaching with possible summated scores ranging from 3-9. Summated scores for innovative teaching as reported by the survey respondents actually ranged from 4-9 with a mean score of 7.52 (SD=1.10).

Multiple regression analysis was used to test if there was relationship between the teacher self-efficacy constructs of ISCT, MTC, SETC, FAOC, SAOC, SEOC, and SSOC and innovative teaching. The results indicated that two of the constructs, MTC (β=.114, p=.043) and ISTC (β=.237, $p < .001$), explained 17.5% of the variance (R^2=.190, $F(7, 390)$=13.071, $p < .001$) (Table 4.46)

Table 4.46

Multiple Linear Regression Analysis of Teacher Self-Efficacy Constructs and Innovative Teaching (N=402)

Explanatory Variable	*Beta*	*t*	*Sig.*
MTC	.117	2.028	.043*
SETC	.045	.694	.488
ISTC	.237	3.549	.000*
SEOC	.125	1.554	.121
SSOC	-.095	-1.277	.202
FAOC	.092	1.324	.190
SAOC	.004	.058	.954

*Significant at α= .05 level

Relationship between Outcome Job Satisfaction and Self-Efficacy

Survey respondents were asked to complete a five question job satisfaction survey with choices of strongly disagree, disagree, neither agree or disagree, agree, and strongly agree. Two of the items were reversed scored and the summation of scores for each questions adjusted accordingly. Then an overall summation of the items was conducted to result in a job satisfaction score. The overall summated score could possibly range from 5-25. Summated scores for Job Satisfaction ranged from 6-25 with mean job satisfaction score of 20.353 (SD=3.124).

Multiple regression analysis was used to test if there was a relationship between the teacher self-efficacy constructs ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC and Agricultural Education teacher job satisfaction. The results indicated that three of the constructs explained 10.4% of the variance (R^2=.120, F(7, 394)=7.664,

$p < .001$). The three constructs were MTC (β=.203, $p < .001$), SSOC (β=.241, p=.002) and SAOC (β=-.140, p=.035) (Table 4.47)

Table 4.47

Multiple Linear Regression Analysis of Teacher Self-Efficacy Constructs and Job Satisfaction (N=402)

Explanatory Variable	*Beta*	*t*	*Sig.*
MTC	.203	3.386	.001*
SETC	-.092	-1.365	.173
ISTC	.064	.934	.351
SEOC	.019	.224	.823
SSOC	.241	3.112	.002*
FAOC	.053	.728	.467
SAOC	-.140	-2.117	.035

*Significant at α=.05 level

Relationship between Outcome Program Impacts and Self-Efficacy

Survey participants were asked to self-report about the program impacts. A three item questionnaire with 6-point Summated Rating Scale (strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, and strongly agree) was utilized to obtain a self-reported measure of program impact. A summated score was generated, which had the possible range of 6-18. Summated scores for program impact ranged from 11-18, with a mean score for program impact of 16.541 (SD=1.683).

Multiple regression analysis was used to test if there was a relationship between teacher self-efficacy constructs ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC and the self-reported program impact. The results indicated that two of the teacher self-efficacy constructs explained 22.7 % of the variance (R^2=.240, $F(7, 393)$=17.747, p < .001). The two constructs were MTC (β=.165, p=.003) and SSOC (β=.239, p=.001) (Table 4.48).

Table 4.48

Multiple Linear Regression Analysis of Teacher Self-Efficacy Constructs and Program Impacts (N=402)

Explanatory Variable	*Beta*	*t*	*Sig.*
MTC	.165	2.961	.003*
SETC	-.018	-.297	.767
ISTC	.079	1.242	.215
SEOC	.105	1.356	.176
SSOC	.239	3.321	.001*
FAOC	.064	.943	.346
SAOC	-.019	-.313	.755

*Significant at α=.05 level

Relationship between Outcome Teacher Retention and Self-Efficacy

For the purpose of this study, teacher retention was measured by asking participants to report how long they have taught at their current school. This number was then used as a measure of longevity of retention. The mean of years at current school was 10.272 (SD=9.386) with teachers spending from 6 months at their current school to 41 years.

Multiple regression analysis was sued to test if there was a relationship between teacher self-efficacy constructs ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC and years at current school, or teacher retention. Two teacher self-efficacy constructs were found to explain 7.1% of the variance (R^2=.087, $F(7, 394)=5.365$, $p < .001$). The two constructs were MTC (β=.318, $p < .001$) and FAOC (β=-.214, $p < .001$) (Table 4.49).

Table 4.49

Multiple Linear Regression Analysis of Teacher Self-Efficacy Constructs and Teacher Retention (N=402)

Explanatory Variable	*Beta*	*t*	*Sig.*
MTC	.318	5.193	.001*
SETC	-.087	-1.279	.202
ISTC	-.012	-.176	.860
SEOC	-.011	-.126	.900
SSOC	.146	1.849	.065
FAOC	-.214	-2.865	.004*
SAOC	.060	.889	.375

*Significant at α=.05 level

Summary

To answer the questions guiding this study various statistical methods were used, these included descriptive statistics, analysis and multivariate analysis. Key findings include: (1) that certification type, traditional or alternative, has no statistical impact on the teacher self-efficacy measure of agricultural education teachers, (2) five of the personal characteristics and all three of the situational characteristics, as predictor variables significantly influenced at least one of the teacher self-efficacy constructs, and (3) the management in the classroom construct (MTC) was found to be significantly related to outcomes of innovative teaching, job satisfaction, program impacts, and teacher retention.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

The purpose of this study was to investigate the extent of teacher self-efficacy beliefs of agricultural science education teachers. The questions that guided this study were:

1. What are the perceived teacher self-efficacy beliefs of agricultural science education teachers?
2. What are the differences occurring in the perceived teacher self-efficacy beliefs of alternatively certified agricultural science education teachers as compared to the traditionally certified?
3. To what extent do personal and situational characteristics impact the perceived teacher self-efficacy beliefs of agricultural science education teachers?
4. To what extent are personal and situational characteristics and self-efficacy beliefs related to designated outcomes of innovative teaching, job satisfaction, program impacts, and teacher retention??

This chapter examines the findings presented in Chapter IV from the questionnaire-based responses of agricultural education teachers in the United States. A summary of findings will be followed by the conclusions drawn from the findings. Implications theory and future research will follow. Finally, implications for practice and policy will be offered.

Summary of Findings

This quantitative study utilized a researcher-developed instrument distributed to a sample of agricultural education teachers through the United States. The researcher developed the instrument via literature research, discussions with experts in agricultural education and teacher efficacy, and pilot testing to arrive at a 73-item survey instrument. The instrument was developed to measure teacher self-efficacy across two domains, in the traditional classroom and outside the traditional classroom. These domains were then divided into three constructs in the domain in the traditional classroom and four constructs in the domain outside the traditional classroom. The three constructs measured in the classroom were management in the classroom (MTC), instructional strategies (ISTC) and student engagement (SETC). The four constructs in the domain outside the traditional classroom were student FFA/SAE engagement (SEOC), student and stakeholder FFA/SAE engagement (SSOC), FFA Advisor (FAOC), and SAE Advisor.

Agricultural education teachers with a membership in the National FFA organization served as the population of the study. Of that population, a sample was drawn and 2,989 were invited via an email containing a unique collection link to complete the questionnaire via the online software Qualtrics. Of those invited, 527 either initiated the survey or indicated they were not interested, leaving a total of 402 useable surveys. The data collection plan consisted of the initial email invitation followed by two reminders. The overall response rate for the study was 14.99%.

Statistical analyses include descriptive statistics, factor analysis, and multiple linear regression analysis. To answer the first question, item means and construct means were calculated. For the second question, a correlation between pathway to certification for agricultural education and teacher self-efficacy was explored. The third question utilized one-way ANOVA to compare the means of the seven teacher self-efficacy constructs with personal and situational characteristics. Finally, multiple linear regression was used to answer question 4, exploring the possible relationships between teacher self-efficacy and identified outcomes of innovative teaching, job satisfaction, program impacts, and teacher retention.

Findings Related to Population Description

Descriptive statistics was used to describe this study's population from nine questions in the demographic section of the questionnaire. On average the, agricultural education teachers were 41.03 years of age and at least 21% of these teachers had three year or less experience in the classroom. A majority of them had Bachelor's Degree in Agricultural Education and 47% reported that a Bachelor's Degree was the highest level of education they had obtained. Almost all of the teachers indicated they taught at either the middle school, high school level or a combination of the two age groups. A majority of the teachers had been involved in the FFA as a youth. Most of the teachers considered their career as an agricultural education teacher to be their first career.

Findings Related to Research Question #1

Descriptive statistics was used to answer the question "What are the perceived teacher self-efficacy beliefs of agricultural education teachers?" The means of items within each construct were determined. Then the construct means were determined from the summated scores of the constructs. The overall answer to this question was that teachers were highly efficacious in instructional strategies in the classroom and in student engagement in FFA/SAE outside the traditional classroom. The areas in which teachers had lower teacher self-efficacy were the student engagement in the traditional classroom and SAE Advisor outside the traditional classroom. Components of this result were the specific findings that follow.

For the teacher self-efficacy construct Management in the Classroom (MTC), means were determined for each of the six items. All items had means there were 3.66 (out of 5) or higher. The top two items included "making student classroom behavior expectations clear" and "enforcing the rules you have established." Both of these items deal with the teachers' actions to control behavior in the classroom. The item with the lowest mean was unlike the top two items as it involved the teachers' management of classroom time rather than behavior. Overall, the teachers' mean MTC score was 22.65 out of a possible 30.

The teacher self-efficacy construct Student Engagement (SETC) had item means ranging from 3.36 to 3.81. The top items consisted of the encouragement of students to think critically and face challenges. "Thinking globally" was an item that teachers scored the lowest of the six items in SETC. Five of the six items in the SETC construct were teacher actions directed as the students. One item, the second lowest mean at 3.45 was more of the teachers' actions and less of the teacher encouraging, provoking, and making students do something. The summated mean for SETC was 21.30 out of a possible 30 points.

The items for the construct of instructional strategies (ISTC) had no mean below 3.61. One item, "incorporating hands-on learning," was scored the highest by agricultural education teachers with a mean score of 4.14. A majority of the teachers felt they were very good or excellent at using hands-on learning in their classes. The lowest scored item with a mean of 3.61 involved the teachers adapting lessons to meet the needs of the students. The summated mean for ISTC was 22.81 out of a possible of 30.

For the in the traditional classroom constructs, MTC, ISTC, and SETC, the overall means of each construct were found to be between 21 and 23. This is slightly higher than being very good at executing the behaviors. Within the in the traditional classrooms construct of ISTC had the highest mean and while the SETC had the lowest construct mean.

The constructs for outside the traditional classroom were also evaluated using one-way ANOVA. SEOC had all six items with similar means. The lowest rated item was one which teachers encouraged students to engage with the community. The highest rated item involved students and their project selection. By far the teachers indicated they were “very good” at the “executing any of the behaviors associated with student FFA/SAE engagement.” The overall mean of this construct was 22.90 out of a possible 30.

The construct similar to SEOC in that it involves engagement, Student and Stakeholder FFA/SAE Engagement outside the traditional classroom (SSOC) sought to explore the element of engagement beyond just the student. The top two-rated items (means of 3.83 and 3.71) that teachers felt they executed well were those related to student participation in events. The item with the lowest mean of 3.21, involved the teacher attempting to engage new students’ families. Most of the teacher felt they were simply “good” at this behavior. The construct mean was 25.22 out of 35 possible points.

Another of the outside the traditional classroom constructs, FFA Advisor or FAOC, was also analyzed using descriptive statistics. Teachers identified that FFA supervision was a behavior they were best at executing as it had a mean of 4.25 (SD=.777). The second highest ranked item was staying informed about FFA activities (M=2.92, SD=.888). The item ranked the lowest in FAOC was the one dealing with maintaining the records of FFA. The mean of FAOC was 30.44 out of a possible 40 points.

The final construct of the outside the traditional classroom constructs was that of SAE Advisor or SAOC. No item in this construct had a mean score above 3.28. The highest ranked item deal with increasing the students' knowledge. The lowest ranked item concerned the teachers' actions of maintaining the logistics involved with SAE projects. The overall mean for FAOC is 16.22 out of a possible 26 points.

Findings Related to Question #2

One-way ANOVA was used to answer the question "What are the differences occurring in the perceived teacher self-efficacy beliefs of alternative certified agricultural science education teachers as compared to the traditionally certified?" Teachers were asked to indicate at what level the certificate to teacher was obtained, Bachelor's Degree, Master's Degree, Alternative Route, and Other. This data was then restructured such that those selecting Alternative Route were in one group and anyone selecting anything other than Alternative Route was identified as Traditional Route to certification. The means were determined for each group for each construct and then compared. The means for the Traditional Route were equal to or slightly higher than those for the Alternative Route. However, these differences were not statistically different.

Findings Related to Question #3

To answer the question “To what extent do personal and situational characteristics impact the perceived teacher self-efficacy beliefs of agricultural science education teachers?” a one-way ANOVA was used. Teachers were asked a series of demographics questions asked which addressed age, years of experience, if they had a Bachelor’s degree in Agricultural Education, pathway to certification, highest degree obtained, if Agricultural Education was a second career, and involvement with FFA as a youth. These items were classified as personal characteristics of the teachers. Situational characteristics were addressed with three separate items containing three questions each. The characteristics assessed were School Resources, School Support, and Supervisor Support. Each grouping of three questions was summated to achieve an overall score for each characteristic.

A one-way ANOVA was conducted to compare the construct scores by age group. The findings were there was a significant difference occurring on MTC scores between the age groups. Specifically, participants aged 30 years or older outscored those in the 20-29 age group in the MTC construct. There was also a statistical significant difference seen between age groups in the ISTC construct. The 30-39 year old group was found to have a higher ISTC score than their younger counterparts. A difference in age groups was also seen in the SAOC construct. However, further explorations did not identify a statistical significance between the groups.

A one-way ANOVA was conducted to compare the effect of years of teaching experience on the constructs. Only one construct was identified to have significant differences occurring between the groups, MTC. Those with 15-19 years experience and

25+ years experience were found to outscore those with 0-5 years experience in the classroom in MTC. While no overall significant differences were found for one other construct, ISTC, the relationship between the years experience groups was explored. A statistical significant difference was identified with the members of 10-14 years experience group outscoring the members of 0-5 years experience in the ISTC construct.

A one-way ANOVA was conducted to compare the construct scores of those with a Bachelor's Degree in Agricultural Education with other degree levels. The means of the constructs of those with a Bachelor's Degree in Agricultural Education as compared to those without were similar.

In the analysis of the level of certification and the degree of attainment, one-way ANOVA was conducted to compare the difference in construct scores based on the level of certification. Level of degree attainment was found to significantly effect SSOC and FAOC. Highest education level obtained was also explored for a possible effect on the constructs. One-way ANOVA indicated that there was a significant statistical difference in the groups in the constructs of ISTC, SSOC, and FAOC. Further explorations into the ISTC construct and highest level of education obtained yielded no statistical difference within the groups. There were statistical differences found between those with a Doctorate Degree and those with a Master's Degree, those with a Doctorate scored higher in SSOC. Those with a Doctorate also scored higher that those who had indicated "Other" as their highest education level obtained in SSOC. And finally, those with a Doctorate were found to outscore those with only a Bachelor's Degree in FAOC.

Participants were also asked to report on their involvement with FFA as a youth. A one-way ANOVA was conducted to determine differences in self-efficacy scores based on membership to FFA as a youth. The findings showed that those who had been a member of FFA as a youth scored higher in the FAOC construct and it was a statistically significant difference between those who had and those who had not been a member. Those who had not been a member of FFA as youth were found to score higher in the MTC construct than those that had been a member.

The final personal characteristic analyzed was Agricultural Education being a second career. Seventy-five of the teachers reported that they considered Agricultural Education a second career. Those teachers indicating that Agricultural Education was a second career scored slightly higher in the constructs of ISTC, SETC, and SSOC, however this was not significantly different than those who considered Agricultural Education to be their first career. Those who considered Agricultural Education to be their first career scored slightly higher in MTC, FAOC, SAOC, and SEOC, however this was not a statistically significant difference.

The situational characteristics, School Resources, School Support, and Supervisor Support were also measured. These were self-reported measures using three questions in each characteristic. One-way ANOVA was conducted on the School Resources characteristic to determine the differences in self-efficacy based on the self-reported School Resources. A significant difference was found in the MTC construct and a possible difference in the SSOC construct. Those that rated their School Resources as "Enough" (score of a 9) were found to score MTC higher than those who only rated their School Resources as "Some" (score of a 6). While an overall difference was found for SSOC, further explorations into the groups did not yield any significant differences.

Situational characteristic School Supports was also analyzed. One-way ANOVA was conducted to determine differences in self-efficacy scores based on the self-reported rating of School Support. The findings were that there were significant differences in the ISTC, MTC, SEOC and SSOC constructs due to perceptions of School Support. Further analysis of the ISTC or SEOC yielded no differences within the groups. Analysis of the groups within MTC found that those who reported a high rating of 9 (or Enough) for their School Support outscored those who only scored their School Support with a rating of a 5 or 6, both indicating "Some" support. In the SSOC, a similar trend was seen with those scoring their perceived School Support with a high rating of 9 outscoring those who only rated their School Support a 6.

Finally, situational characteristic Supervisor Support was analyzed. One-way ANOVA was conducted to determine differences in self-efficacy scores based on the self-reported rating of Supervisor Support. The findings were that there were significant differences in the ISTC, MTC, FAOC and SAOC constructs due to perceptions of Supervisor Support. Further analysis of the FAOC or SAOC yielded no differences within the groups. Analysis of the groups within MTC found that those who reported a high rating of 9 (or Enough) for their Supervisor Support outscored those who only scored their Supervisor Support with a rating of a 4 or 7, both indicating "Some" support. In the ISTC, a similar trend was seen with those scoring their perceived Supervisor Support with a high rating of 9 outscoring those who only rated their Supervisor Support a 4.

Findings Related to Question #4

Multiple regression analysis was used to answer the fourth question "To what extent are personal and situational characteristics and self-efficacy beliefs related to designated outcomes?" There were four areas identified as outcomes, innovative teaching, job satisfaction, program impacts and teacher retention. Teacher retention, for this study, was measured by a question asking teachers how long they had been teaching at their current school. Data for innovative teaching, job satisfaction, and program impacts were gathered by asking a series of questions in each grouping. And as mentioned earlier with situational characteristics, scores were determined by summing the items in each group. These were self-reported scores.

Findings indicated that MTC and ISTC scores are related to the scores of Innovative Teaching. As for Job Satisfaction, three constructs were found to be significantly related, MTC, SSOC, and SAOC. MTC and SSOC scores were related to the scores of Program Impact. And finally, MTC and FAOC was found to be related to the scores of Teacher Retention. Therefore, MTC is an important construct in determining outcomes for agricultural education teachers.

Conclusions and Discussions

Conclusion 1: Teachers are fairly highly efficacious in the areas of Instructional Strategies in the Traditional Classroom and Student Engagement Outside the Traditional Classroom and least efficacious in Student Engagement in the Traditional Classroom and SAE Advisor Outside the Traditional Classroom.

Overall, this study found agricultural education teachers to be fairly efficacious both inside and outside the traditional classroom. Teachers are least efficacious outside the traditional classroom in SAOC, or the SAE Advisor outside the traditional classroom domain. This reflects similar work done by Wolfe (2008), in which the SAE domain was identified as the domain with the lowest teacher-efficacy score. Also, Roberts and Dyer (2004b) indicated that even teachers who completed a traditional route to certification in Agricultural Education felt a strong need for more in-service training in the realm of SAE. SAE appears to be an area in which teachers do not feel completely capable. Researchers have found that 95% of the teachers in their study reported that SAE was an important or somewhat important part of their agricultural education program (Rubenstein, Thoron, & Estepp, 2014). They also found that participants reported moderately high scores in items related to SAE. One question not asked in this study that could have addressed the SAOC construct was if the participants had participated in SAE while in middle and/or high school. Rubenstein, et al. (2012) found that teachers with no SAE experience in middle and/or high school had lower self-efficacy in the areas related to supervision of SAE, but had higher self-efficacy for the logistics of SAE. This ties into the theories of past performances influence confidence (Siegle, 2000). Siegle (2000) summed it up as “nothing breeds success like success” especially considering self-efficacy development. Teachers who have had experience with SAE are familiar and possibly successful with logistics from their youth experiences with SAE. If they doubt their abilities in this area, they may think of SAE as a threat and thus avoid it (Bandura, 1997).

Teachers in this study also reported lower scores in the SETC, student engagement in the classroom. Teachers indicated that they were better at some items with in SETC, such as “encouraging students to think critically” and “encouraging student to face challenges." A number of things could impact their teacher self-efficacy in this area, the size of their classes, the education level of their students, or the resources at their disposal. Many of those things are often beyond the control of the teacher. Situations like these could be stressful thus lowering their efficacy (Bandura, 1994). A teacher's self-efficacy could also be influenced by the social persuasion and vicarious experiences (Bandura, 1994; Siegle, 2000). In pre-service, agricultural teachers who pursue a traditional route to certification complete a designated term of student teaching. During this time novice teachers are mentored by an in classroom teacher. If during this time the experience is not one that is positive or meaningful, then the teacher takes with them nothing to increase their teacher self-efficacy. There may be no vicarious experience for which the teacher to develop self-efficacy, meaning they are not witnessing the in-classroom teacher having success with their SAE program.

Teachers reported highest scores in SEOC, student FFA/SAE engagement outside the classroom. Possibly, removing the stressful situation of the classroom removed the issues that lower teacher efficacy. Removing the traditional classroom setting and placing the teacher role into a position of advisor may provide the social encouragement needed by the teacher from the students who want to participate in FFA/SAE. Also, a large majority of the teachers in this study had youth experience with FFA, thus having built self-efficacy via past performances. This self-efficacy was then possibly translated from their student role into their teacher role.

The inside the traditional classroom construct of ISTC had the highest score among this sample of teachers. Since many of the teachers in this study had a Bachelor's Degree in Agricultural Education, once again mastery experiences (Bandura, 1994) could play a role in teachers developing a strong efficacy in the instructional strategies. Also, National FFA Teachers provides abundant instructional support on an ongoing basis, which incorporates social encouragement that could also assist in development of teacher self-efficacy. So it appears that having a Bachelor's degree in the subject area and the continual external support help an agricultural teacher develop a stronger sense of efficacy in the realm of instructional strategies. Thus, these results amplify the importance of Bandura's mastery experiences and social persuasion to the development of teacher self-efficacy.

Conclusion 2: Management in the Traditional Classroom is very important to the outcomes of Innovative Teaching, Job Satisfaction, Program Impacts, and Teacher Retention

This study addressed whether the constructs ISTC, MTC, SETC, FAOC, SAOC, SEOC, and SSOC could predict the outcomes of Innovative Teaching, Job Satisfaction, Program Impacts, and Teacher Retention. Self-efficacy has been shown to influence teacher motivation and performance (Bandura, 1977; Tschannen-Moran & Woolfolk Hoy, 2001; Tschannen-Moran et al., 1998). Further, teacher self-efficacy influences teacher behaviors related to their role as a teacher (Skaalvik & Skaalvik, 2007; Tschannen-Moran & Woolfolk Hoy, 2001).

Some of the constructs were found to have some small amounts of predictability on the outcomes of innovative teacher, job satisfaction, program impacts, and teacher retention. The construct "management in the classroom" (MTC) appears to be one that is linked to every outcome. Teachers with higher MTC have better outcomes. Therefore a number of scenarios are likely. If a teacher is able to control their classroom, they are able to be more innovative and feel their program is more impactful. A teacher with classroom management skills is most likely a teacher who is not stressed, thus not impacted by the negativity that lowers the teacher efficacy. Those teachers who are satisfied in their jobs because of the less stressful situations are less likely to leave.

MTC and FAOC were found to be slight predictors to teacher retention. Knobloch and Whittington (2003) found that there was a positive relationship between self-efficacy and career commitment. MTC, management in the classroom was found to be an influence on job satisfaction in this study. This finding compliments that found by McKim and Velez (2015). Blackbun and Robinson also found that a strong positive relationship between perceived classroom management and job satisfaction. And teachers early in their career report that classroom management is a major issue faced (Myers, et al., 2005; Talbert, et al., 1994).

In contrast to those with higher MTC efficacy, could be those who experience more stress and possibly burnout. Bouwers and Tomic (2000) found that teachers' perceived self-efficacy in the areas of classroom management should be taken into consideration when addressing issues of teacher burn out. The lower the teacher self-efficacy in classroom management the greater the possibility for a teacher to burn out and thus, leave the profession of teaching. Leiter (1992) described teacher burnout as a crisis in teacher efficacy. If the level of student disruptions was high, then the teacher's self-efficacy would be low and thus a teacher could be heading toward burn out (Bouwers & Tomic, 1998). Glickman & Tamashiro (1982) found that teachers with a low teacher self-efficacy are most likely to drop out of the profession.

Innovative teachers are more willing to use technology and new ideas in the classroom. Teachers in this student with a higher ISTC score perceived that they utilized innovative teaching techniques. Fuchs, Fuchs, and Bishop (1992) found that self-efficacy is a predictor of a teacher's adoption of innovation into the classroom, thus the higher the self-efficacy the more likely the teacher to utilize new concepts in the classroom. Goddart et al. (2004) found that those with higher efficacy to be an indicator of productive teacher practices. Teachers with a high sense of teaching efficacy have been found to use new ideas in the classroom to meet the needs of their students (Berman, et al., 1977; Guskey, 1988; Smylie, 1988; Stein & Wang, 1988).

A relationship has been identified between job satisfaction and higher levels of job performance (Judge, Thorenson, Bono & Patton, 2001). And teachers who are highly efficacious have a strong commitment to their profession (Coldarci, 1992). Lee, et al. (1991) showed that highly efficacious teachers also have a high teacher-self efficacy.

Highly efficacious teachers in the areas of instruction, management, and teacher student relationships had more cognitive and emotional resources to encourage and motivate student achievement (Woolfok Hoy & Davis, 2005). Efficacious teachers are more likely to prompt students to continually complete challenges and seek out a deeper understanding of the instructional material utilized. Those with higher teacher self-efficacy have also been found to be more student-centered (Czerniak & Shriver, 1994; Enochs Sharmann, & Riggs, 1995). Relatedly, Ashton and Webb (1986) found that those teachers with high efficacy have more successful students. Finally, this study found that teachers who were highly efficacious in MTC and SSOC perceived their program impact to be higher.

So high teacher self-efficacy in classroom management is an important factor in all of the outcomes identified for this study. Based on the findings, it could be conjured that those teachers with higher self-efficacy in classroom management have more impactful programs, are more often innovative teachers, are more often satisfied with their jobs and consequently less likely to leave the profession. There are other constructs that relate specifically to certain outcomes. Those teachers who have a strong self-efficacy in instructional strategies are more often recognized as an innovative teacher. One particularly surprising impact was that of SAOC to job satisfaction. Teachers were found in this study and other studies to score lower on the constructs related to SAE advisor role. There is a need for more work in this area to explore the connection of teacher self-efficacy to job satisfaction.

Conclusion 3: Route to certification has no relationship to teacher efficacy development.

While there is a critical need for agriculture education teachers, this study was constructed on the premise that there would be differences in the teacher self-efficacy of those that were alternatively certified as compared to those that pursued education via the traditional route. When considering the assessment scores of university supervisors, Robinson and Edwards (2012) determined that traditionally certified teachers outscored the alternatively certified teachers in two of the teacher efficacy constructs on the Teachers' Sense of Efficacy Scale created by Tschannen-Moran and Woolfolk Hoy (2001). The expected outcome of this study, then, was that those utilizing the alternative route would have a statically significant lower teacher self-efficacy. However, for this population of teachers, the result was that there was not a statistical difference between the two groups. It would appear that while the two groups do not necessarily share the same "mastery experiences", the teacher self-efficacies are similar. Teachers were also asked about their previous careers if agricultural education was a second and most of the respondents indicated a previous field related to agricultural or environmental areas. This could be how the alternatively certified teachers are building teacher self-efficacy through the mastery experiences related to agricultural or environmental experiences.

So these findings are similar to other studies, Rocca and Washburn (2006) also found nothing indicating differences between the demographics of alternatively versus traditionally certified teachers, and no differences in the summated scores for the two groups. Essentially, they felt that while the alternatively certified teachers' lacked the formal education, their teacher efficacy in regards to teaching methods or pedagogy was no lower than those who were traditionally certified. Further, Rocca and Washburn (2006) determined that traditionally and alternatively certified teachers share similar beliefs in regards to their ability to teacher effectively.

The expected outcome was that those alternatively certified would have a lower efficacy score in some areas, possibly all areas. However, it must be noted that many of those who indicated that they viewed agricultural education as a second career, had first careers in an agricultural area. These same teachers could be someone who utilized the alternative certification program, thus bringing agricultural experience with them into the classroom. Robinson and Edwards (2012) found that alternatively certified teachers in their first year "perceived the largest amount of growth in student engagement and instructional practices during the year" (p. 157).   The assumption is that traditionally certified teachers have higher levels of teacher self-efficacy as compared to those who are alternatively certified (Roberts & Dyer, 2004). This study and the one conducted by Robinson and Edwards (2012) indicate otherwise. One might be able to argue that teachers who utilize the traditional route to certification receive more pedagogical training and were thus more critical of their performance as they were aware of the expectations (Rocca & Washburn, 2005).

Also it should be considered, that no formal evaluation has been conducted to see what alternative certification programs look like throughout the United States. These could be rigorous programs in some areas, while others are not. So the program the teacher utilized to get their alternative certification along with their previous degree and career experience could be impacting the teacher self-efficacy development.

Therefore, this study raises additional questions. Does and if so, in what ways, previous career experience affect efficacy development? Does the type of alternative certification program matter? Does it matter the type of degree they have obtained prior to the alternative certification program?

Conclusion 4: Personal and situational characteristics are not strong predictors of teacher-efficacy but they do have small varying degrees of influence.

Do personal and situational characteristics have impact upon the teacher self-efficacy? In this study, there were no personal characteristics and situational characteristics that were strong predictors of teacher self-efficacy. Some of the constructs, like MTC saw that youth membership in FFA and the level of perception of the school resources were slightly important. Management in the classroom is important for teachers and for those teachers who have been involved for a period of item with FFA have picked up leadership skills that have possibly grown into management skills.

Teachers who feel they have enough resources possibly feel more in control of their classroom, thus having a higher efficacy.

The older a teacher, the higher the MTC score. Age while not identified in this study as a predictor, still had an influence on the MTC score. As noted before, Bandura (1994) developed theory around mastery experiences having an effect on efficacy. This could be interpreted, as the older the person is in years the more opportunity to have had and to have mastered experiences. As a person ages, they are faced with challenges, they succeed and they fail, the way in which they grow impacts the efficacy. Years of experience is important, but not a predictor.

There is a slight impact to SAOC, but no real differences between the age groups. SAOC, or SAE Advisor outside the traditional classroom, construct, was one of the lower scored constructs for teachers of this study. Agricultural teachers on average dedicate about 3% of their time to SAE (Terry & Breirs, 2010). Teachers feel that students should be engaged in SAE (Roberts & Dyer, 2004) but researchers determined that some teachers do not feel SAE is appropriate for their agricultural education programs (Camp, Clarke, & Fallon, 2000).

According to the findings in this study, it does not seem to matter if one has a Bachelor's Degree in Agricultural Education, but it does appear that the level at which the certification is obtain can slightly predict FAOC scores along with how high of a degree has been obtained and if they were a youth member of FFA. Once again being a youth member of FFA shows some importance that matched previous research that those who participated in previous leadership experience may have a greater sense of efficacy

(Birkenholz & Schumacher, 1994). It may also indicate skills being taught to the youth in FFA translate into the career of an agricultural education teacher.

Since no characteristics seems to have strong predictability power, it might be that more study needs to be done on the identification of the characteristics and how they are measured. To what extent does self-report by the teachers provide an accurate representation of the reality facing the agricultural education teachers. Could there be instances of over inflated perceptions by the teachers?

Conclusion 5: The instrument created for this study measures teacher self-efficacy of agricultural science education teachers.

The researcher-developed instrument used in this study was based on previous models and additional information in order to develop a measure of the teacher self-efficacy of a teacher who exists in the traditional classroom and outside the traditional classroom. Many of the previous measures have utilized approaches developed by Tschannen-Moran and Woolfolk Hoy (2001). The Teacher's Sense of Efficacy Scale (TSES) is regarded by it's creators as an all-purpose type of measure because of its ability to assess a broad range of capabilities that can be applied to teachers across a myriad of educational disciplines (Tschanne-Moran & Woolfolk Hoy, 2001). While this type of general instrument has utility, it also has its limits (Bandura, 2006). The generalized instrument misses specific measures that would be beneficial to the study and measurement of the teacher self-efficacy of agricultural education teachers.

Some scholars have approached the measure of teacher self-efficacy of the agricultural education teacher by utilizing domains or constructs specific to the agricultural education teacher (Duncan & Ricketts, 2006; Wolf, 2008). The difference between those instruments and this study's instrument is the unique focus this instrument takes in identifying the teacher role inside and outside the traditional classroom.

The instrument in this study provides the generalization seen in the general instruments, thus allowing for comparison of results to other teachers in other disciplines on the constructs of classroom management, instructional strategies, and student engagement. However, it moves beyond the general to the more specific role of agricultural education teacher in the constructs of FFA Advisor, SAE Advisor, student engagement in FFA/SAE, and student and stakeholder engagement in FFA/SAE outside the traditional classroom. Having shown its validity, this new instrument now needs further reliability testing as discussed in the following future research section.

Implications for Theory and Future Research

The following is a discussion on the how this study relates to the theory upon which it was based. It also speaks to predictors as well as the importance of the outcomes related to teacher self-efficacy. Concluding this section is a presentation on future research that can be proposed especially from the creation of this new instrument.

Implications for Theory

Within a milieu of a growing U. S. population and challenges in teacher retention, agricultural science education has experienced teacher shortages. This study chose to look at the teacher self-efficacy development and measurement of agricultural science education teachers as means to better understand the predictors of teacher self-efficacy and impacts of teacher self-efficacy on specific outcomes. Just as many other educational programs have, Agricultural Science Education utilized the alternative certification route to certification as well as the traditional route to certification to fulfill the teacher shortages occurring in the programs.

Related to predictors, in this this study, the older a person was, the higher their teacher self-efficacy especially in the area of classroom management. This could be interpreted as a person ages they have many experience and thus built their self-efficacy via these mastery experience consistent with Bandura's (1994) mastery experiences as one of four influences that led to the development of self-efficacy in individuals recognized. A person with successful experiences would develop a higher sense of self-efficacy, while those who had negative or unsuccessful experiences may develop a lower sense of self-efficacy. In this study, the older a person was, the higher the teacher self-efficacy for management in the classroom, this could be interpreted as a person ages they have had many experiences and thus built their self-efficacy via these mastery experiences.

Theoretically, this study was grounded in Bandura's (1986) Social Cognitive Theory and Bandura's (1997) Self-efficacy Theory, situated in the belief in one's capabilities to generate a particular outcome. Based on Bandura's (1997) work, the lack of a skill set(s) could result in the teacher having a lower teacher self-efficacy. This was definitely seen in of the constructs in this study. Teachers scored lower in their SAOC construct, and this compliments Bandura's assumption that the lack of skill set might be the cause. Teachers consider it to be one of the most difficult areas to utilize and teach in their programs (Dyer & Osborne, 1995) and those without youth experience have a lower self-efficacy in SAE supervision (Rubenstein, et al., 2014). While this may seem more related to the outcome of program impacts, it is in fact a perfect example of the preservice training in the form of the Undergraduate Degree in Agricultural Education playing a role in the development of teacher efficacy. If these programs are not structured such that development of self-efficacy can occur through experiences with SAE during their student teaching or their course work, then the result is a lower efficacy.

Another of Bandura's (1997) four influences informed by this study was that of social persuasion or encouragement. This study showed that there was influence of school support and supervisor support on the teacher self-efficacy, those teachers who perceived high levels of those support had higher levels of teacher self-efficacy.

And finally, this study was focused on the teacher self-efficacy theory which is predicated on the research that teaching efficacy can impact the teacher's ability to generate desired goals (Tschannen-Moran & Woolfolk Hoy, 2001). In this case this study attempted to identify the relationship between self-efficacy impact and outcomes. Management in the classroom was an important predictor to all the identified outcomes for this study; and management in the classroom was influenced by age. Thus, the study further shows importance of the mastery experiences over time in the outcomes of innovative teacher, job satisfaction, program impact, and teacher retention.

Table 5.1 provides a description of other studies into teacher self-efficacy of agricultural education teachers and how these compared to what was found in this study of teacher self-efficacy. This study also provides an instrument with which teacher self-efficacy can be measured specifically in agricultural education teachers.

Future Research

Further research in the area of measuring teacher self-efficacy is needed. As this research developed a new teacher self-efficacy instrument specific to agricultural science education teachers, refinement of the instrument and replication of this study to test the reliability of the instrument with other teacher-self efficacy instruments are next steps. This study's instrument was built from existing instruments, from literature research, and discussions with experts.

This was the first study conducted with this approach and instrument. The initial purpose was to measure teacher self-efficacy of agricultural education teachers. The approach was taking into consideration the unique dual role played by Agricultural Education teachers. Agricultural Education teachers do exist in the traditional classroom setting that other Teacher Self-efficacy instruments have been proven to measure (Table 5.1). The difference between this instrument and those other instruments is the added group of constructs used to measure teacher self-efficacy outside the traditional classroom setting in the world of FFA and SAE. Other instruments included specific constructs for FFA and SAE, but not for student engagement or student/stakeholder engagement outside the traditional classroom. The inside the classroom portion of the instrument was based on the three groups of management in the classroom, instructional strategies, and student engagement and reliability studies have been thorough in this area. However, the group of constructs that address teacher self-efficacy outside the traditional classroom needs more work done on the reliability. This area needs to be developed more and tested more to improve the reliability. The items that make up each construct need to be carefully evaluated to ensure they fit within their current constructs and if any other items would be beneficial to the measurement of teacher self-efficacy.

Another area of concern that needs to be addressed in future research is that of the sample size. Support from National FFA with the population provided for good sampling opportunities. However, an approach outside of using online survey software may be needed to obtain larger samples. Increasing the sample size would provide more insight to the constructs, by providing a more diverse population throughout the study. More specifically a larger population might provide more insight into areas of traditionally and alternatively certified teachers as well as adding some other predictors not studied in this project. Gender and race were dropped as predictors early on due to the low populations reporting which would not provide for proper statistical analysis. For future use, this instrument could be translated and tested for use by the Spanish speaking Puerto Rican Agricultural Education teachers.

An additionally challenging dimension that warrants future attention is how to effectively measure the situational characteristics and outcomes associated with the instrument. While self-reporting by the teachers provided a basis to develop this instrument, this researcher is left to wonder about the accuracy of self-reporting in some areas such as supervisor support and school support. Robinson & Edwards (2012) indicated that self-assessments could be problematic, thus the need to develop a more all encompassing measure that included the complete list of stakeholders or participants into the role of an agricultural science education teacher. These participants make up the influence area of Bandura’s (1997) social persuasion.

Situational characteristics are grouped in previous studies as General Teaching Efficacy (GTE). The meaning of GTE has been debated by researchers resulting in the use of many labels (Tschannen-Moran et al., 1998). This construct of teaching efficacy has been described as the “external influences” (Emmer & Hickman, 1990) or “outcome expectancy” (Riggs & Enochs, 1990). The GTE is related to factors which exist beyond the individual capabilities of the teachers, but teachers have a belief they can have an influence on these factors such as the value placed on the education at home (Tschannen-Moran & Woolfolk Hoy, 2001). So these characteristics are beyond their control and possibly beyond their measure or rating. This may mean that there must be a dependency on self-reported measures to measure teacher self-efficacy.

Other areas of future research include those of the predictors related to the four influences of self-efficacy as described by Bandura (1994). One question not addressed is that of SAE participation as a youth by the teachers. Rubenstein, et al. (2014) has done some work in the area but there is still more work to be done. Their recommendation of further work in the area between theory and policy to address issues of beginning teachers entering with high teacher self-efficacy in SAE but lacking in the SAE implementation is one that can be echoed from this study as well. There is a need for deeper understanding of area of SAE, and possible reasons why teachers reported to be least efficacious.

Table 5.1

Summarization of Studies of Teacher Efficacy of Agricultural Education Teachers

Title	Authors	Major Themes	Population	Instrument	Findings	Relation to this study
Assessing teacher self-efficacy and job satisfaction of early career agriculture teachers in Kentucky	Blackburn & Robinson (2008)	Teacher efficacy and job satisfaction	All early career agricultural education teachers in Kentucky	TSES	Teachers were efficacious in all three constructs. Most efficacious with classroom management and least efficacious with student engagement.	Similar teacher self-efficacy findings.
Comparison of teacher efficacy among traditionally and alternatively certified agriculture teachers	Rocca & Washburn (2006)	Teacher efficacy and certification process	Florida Agricultural education teachers in their 1st five years of teaching	Adapted TSES	No distinguishable differences between the two groups on perceived teaching efficacy. Also years of teaching had little effect.	Similar findings of no differences between two certification groups
Teacher efficacy of novice teachers in agricultural education in Ohio at the end of the school year.	Whittington, McConnell, & Knobloch (2006)	Teacher efficacy, novice teachers, Stage of development, Summer activities, classroom variables and future plans in teaching	Novice teachers in Agricultural in first three years in Ohio in 2002	TSES	Novice teachers were found to be efficacious at end of school year, but experience found to not impact efficacy. Teacher preparation and student teaching experience had greatest influence.	Teacher preparation is important in regards to having a Bachelor's Degree in Agricultural Education.

Table 5.1 (continued)

Summarization of Studies of Teacher Efficacy of Agricultural Education Teachers

Total program efficacy: A comparison of traditionally and alternatively certified agriculture teachers	Duncan & Ricketts (2008)	Perceived level of efficacy, total program of agricultural education teacher, alternative and traditional certification	348 middle and high school agriculture teachers (2004-05) in GA.	Modified version of Borich needs assessment model	Traditionally certified found to most efficacious in program management abilities and least efficacious in technical agriculture content knowledge. Alternatively certified most efficacious in their pedagogical strategies and least efficacious in the technical agriculture content knowledge.	Different findings
Differences in teacher efficacy related to career commitment of novice agriculture teachers	Knobloch & Whittington (2003)	Career commitment and teaching efficacy	91 novice teachers (1st, 2nd, and 3rd year) in Ohio	OSU-TES (Teacher efficacy scale)	Teachers with a higher career commitment had an increase in teaching efficacy during 1st ten weeks.	Those with high job satisfaction had higher efficacy scores
The influence of the initial ten weeks of the school year on novice teacher efficacy in agricultural education	Knobloch & Whittington (2003)	Initial ten weeks of school year and novice teaching efficacy	Equal numbers of student teachers', 1st, 2nd, and 3rd year teachers.	Author created (based on Bandura's Theory)	Teaching efficacy for 1st year teachers during first 10 weeks decreased. Student teachers, 2nd, and 3rd year teachers were not influenced.	Those with less years experience had less teaching efficacy

Table 5.1 (continued)

Summarization of Studies of Teacher Efficacy of Agricultural Education Teachers

Personal teaching efficacy, general teaching efficacy, and content efficacy: A comparison of first and fifth year agriculture teachers	Burris, McLaughlin, Brashears, & Fraze (2008)	General teaching efficacy, personal teaching efficacy, content efficacy	1st year and 5th year teachers in Texas (2006-07)	Short form TES	PTE found to be higher that GTE for both groups. 5th year had higher PTE and GTE that 1st year.	PTE and GTE not specifically studied.
Changes in teacher self-efficacy from the student teaching experience through the third year of teaching.	Swan, Wolf, & Cano (2011)	Teacher self-efficacy and beginning teachers	Fall 2004 student teacher cohort at OSU (17 teachers)	TSES	Lowest levels of teacher efficacy were reported at the end of the first year of teaching and highest levels at the end of student teaching. Student engagement was the lowest in all assessments.	Student teaching not evaluated.

Table 5.1 (continued)

Summarization of Studies of Teacher Efficacy of Agricultural Education Teachers

Agricultural education perceived teacher self-efficacy: A descriptive study of beginning agricultural education teachers.	Wolf (2011)	Teacher self-efficacy and agriculture education teachers	47 Agricultural Education teachers in Ohio with four years or less experience and certification via a teacher preparation program at OSU	Combination of researcher designed instrument and adapted TSES	Teachers most effacious in the classroom domain and least in the SAE domain. Males had higher teacher efficacy than females.	Similar results with in the classroom constructs and the low SAE construct. Gender not evaluated.

Implications for Practice and Policy

This study and its instrument were intended to measure teacher self-efficacy of agricultural education teachers. Agricultural Education teachers exist in two worlds one of the traditional classroom and the other outside the traditional classroom. This instrument provides a way to measure their self-efficacy in the traditional setting which if needed could possibly be compared to other teachers in similar fields. But it goes beyond to also provide a way to measure teacher self-efficacy in the student FFA/SAE engagement, student and stakeholder FFA/SAE engagement, FFA advisor, and SAE advisor. In particular, the use of the instrument has implications for in-service and continuing education, on-the-job experiences, and pre-service education. Attention to these dimensions may serve the profession as an antidote to teacher retention.

In-service and Continuing Education

Both the inside and outside the classroom measures of teacher self-efficacy become important in better understanding what teachers need once they have entered the classroom to teach. Determining where teachers may have low efficacy points to in-service needs of teachers and could assist in streamlining the continuing education that is offered to teachers. Also, it could possibly be used to assist those teachers who are seeking higher degrees or further education as to what courses could be the most beneficial for their development.

Teachers who utilize training at national, regional or local meetings related to agricultural education could use the teacher self-efficacy measurement to identify the specific areas that training at these meetings would be beneficial. This could be beneficial in ensuring that teachers make the most out of meetings and trainings they attend. This instrument could provide individuals that conduct the trainings a methodology by which they offer training that is most needed to a particular area, possibly ensuring higher attendance at trainings and more efficient higher quality training.

On-the-Job Experience

Additionally, this instrument could provide more insight into solutions to current agricultural teacher education shortages and possible ways to prevent these shortages in the future. Identifying the areas, in which teachers have low self-efficacy scores that are often connected to the outcome of burnout and the eventual leaving of the profession, could provide the means to stop the cycle of teacher burnout. Also, a better understanding of the different ways in which the alternatively certified teachers build their teacher self-efficacy as compared to how those who are traditionally certified build their teacher self-efficacy could inform the overall pathway to certification. This study showed no statistical difference in the teacher self-efficacy scores of the alternatively certified teachers as compared to those who were traditionally certified. Thus, understanding how the teachers who are alternatively certified are developing their efficacy beyond mastery experiences of the traditional certification route. It could be of benefit to those developing those traditional preparation routes to ensure they are of high educational quality.

Utilizing the instrument as a means to identify the needs of teachers could be beneficial in the assignment of mentors to teachers in their early years of service. This instrument could be used to pair teachers who have a higher sense of teacher self-efficacy in certain areas with teachers who have a lower sense of teacher self-efficacy in that area.

This would provide a means to utilizing the social persuasion aspect of Banudra's (1994) self-efficacy development of individuals while providing strong examples to those with lower teacher self-efficacy to build their efficacy via persuasion and vicarious modeling.

Pre-Service

Eventually this instrument could be adapted for the use with *pre-service* teachers to identify their needs prior to completion of degrees. Admittedly, not every construct may be addressed with a formal college course, but it could suggest needed curricular changes. Also, this may identify why the teacher shortage is occurring in this field. If issues can be addressed prior to teachers entering into the classroom or in their early years, this could alleviate some of the issues with teacher retention. Using this instrument during the student teaching portion of the student's program could also identify areas in which the student may show signs of low teacher self-efficacy.

Summary

This chapter summarized the study's findings and offered five key conclusions. Specifically, the conclusions are (1) Teachers are fairly highly efficacious in the areas of ISTC and SEOC and least efficacious in SETC and SAOC; (2) Route to certification has no relationship to teacher efficacy development; (3) Personal and Situational Characteristics are not strong predictors of teacher-efficacy but they do influence to some degree; (4) MTC is very important to the outcomes of Innovative Teaching, Job Satisfaction, Program Impacts, and Teacher Retention; and (5) this instrument effectively measures teacher self-efficacy of agricultural education teachers.

Further work needs to be done to this instrument to test the reliability and strengthen the overall measure of the instrument especially in the constructs related to outside the traditional classroom. Also, consideration needs to be given to identify the characteristics and possible, but feasible, ways to measure them in an effort to target possible predictors of teacher self-efficacy. And an alternative approach should be explored to address the teacher self-efficacy constructs and outcomes as the teacher self-reported outcomes are possibly limiting the link between the two.

This study had implications for pre-service education and continuing education of agricultural education teachers. At the pre-service level, the instrument developed for this study could be of adapted to address the pre-service teachers in an effort to identify issues that may affect teacher retention in the future. At the continuing education level, the instrument could be of assistance to identify topics for and streamline the delivery of professional development offered to teachers.

This study is just the beginning to better understanding the teacher self-efficacy development of the agricultural education teacher both inside and outside the traditional classroom. A high sense of efficacy is an important part of adulthood, Bandura said it best with “People who regard themselves as highly efficacious act, think, and feel differently from those who perceive themselves as inefficacious. They produce their own future, rather than simply foretell it” (1986, p. 395).

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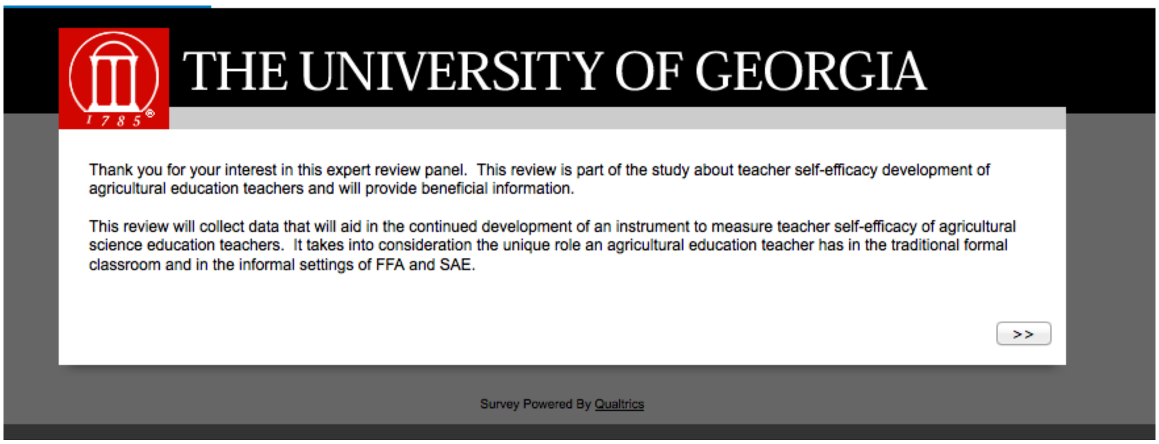
APPENDICES

APPENDIX A

EXPERT REVIEW INSTRUMENT WITH IMPLIED CONSENT FORM


THE UNIVERSITY OF GEORGIA
1785
Thank you for your interest in this expert review panel. This review is part of the study about teacher self-efficacy development of agricultural education teachers and will provide beneficial information.
This review will collect data that will aid in the continued development of an instrument to measure teacher self-efficacy of agricultural science education teachers. It takes into consideration the unique role an agricultural education teacher has in the traditional formal classroom and in the informal settings of FFA and SAE.
>>
Survey Powered By Qualtrics

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1785

Study Consent

YOUR ARE BEING ASKED TO PARTICIPATE IN A research study titled *Predictors and Measures of Teacher Efficacy in Agricultural Science Education Teachers*. The purpose of the research is to understand the predictors and development of teacher self-efficacy beliefs of the agricultural science education teacher. Please know the research activity is being conducted by the individual listed below under the supervision of Dr. Lorilee Sandmann and the results may be published.

Kisha L. Shelton
Program Coordinator III
Doctoral Candidate, The University of Georgia
University of Georgia
[redacted]

As a participant in this study, you will BE ASKED TO complete an online 65 question survey and an audio-recorded phone/Skype interview about the importance of these teaching behaviors to teacher efficacy development. There are no foreseen risks to you participation. Your participation is voluntary. You may refuse to participate or withdraw at anytime without penalty or LOSS OF BENEFITS WHICH YOU WOULD OTHERWISE BE ENTITLED, or skip any question you feel uncomfortable answering. The questionnaire should take 15-20 minutes to complete the online questions and the phone/Skype interview should take 30 minutes.

All of your responses will be confidential and will not be associated with your name or e-mail address. However, a unique identifier will be assigned to each respondent that has no meaning outside of the survey website. If necessary, this will allow each respondent to return to an incomplete survey and be taken directly to the point of exit. If the survey remains incomplete the researcher cannot access it and the answers will not be used as part of the study.

Please note: *Internet communications are insecure and there is a limit to the confidentiality that be guaranteed, due to the limits of the technology. Be assured that once the researcher receives the completed survey, standard confidentiality procedures will be followed. In addition, no individual data will be reported, only summarized data.*

Moreover, if you feel uncomfortable with the risk to privacy with taking an Internet survey, you can open PDF version of the survey instrument located at [insert link]. Simply complete the survey by hand and then submit via fax [redacted] or US mail at the address above.

If you have questions, PLEASE CONTACT US: PI LORILEE SANDMAN, PH.D., PROFESSOR OF ADULT EDUCATION, AT [redacted] OR [redacted] OR CO-PI MS. Kisha Shelton, DOCTORAL CANDIDATE IN ADULT EDUCATION, at [redacted] or [redacted]

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

Please indicate your participation:

- ◯ Yes, I give consent to participate in this study.
- ◯ No, I do not give consent to participate in this study.

>>

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Section 1: Tradional Classroom Instruction
Part of agricultural education takes place in the traditional formal classroom setting.

How important are the following teacher behaviors in the formal classroom setting?

	Not Important	Slightly Important	Moderately Important	Very Important	Extremely Important
1. Controlling disruptive behavior in the classroom.	○	○	○	○	○
2. Minimizing inappropriate classroom behavior.	○	○	○	○	○
3. Getting students to follow classroom behavior guidelines.	○	○	○	○	○
4. Maintaining the scheduled time as time engaged.	○	○	○	○	○
5. Ensuring that classroom records are maintained.	○	○	○	○	○
6. Making expectations about student behavior clear.	○	○	○	○	○
7. Enforcing rules that I have established.	○	○	○	○	○
8. Developing performance based assessments for students.	○	○	○	○	○
9. Establishing a classroom management system with each group of students.	○	○	○	○	○
10. Increasing awareness of global agriculture.	○	○	○	○	○
11. Encouraging students to think critically.	○	○	○	○	○
12. Encouraging students to face challenges.	○	○	○	○	○
13. Improving the understanding of a student who is failing.	○	○	○	○	○
14. Getting through to the most difficult students.	○	○	○	○	○
15. Motivating students who show a low interest in school work.	○	○	○	○	○
16. Provoking thinking or inquiry of students.	○	○	○	○	○
17. Motivating students utilize teamwork.	○	○	○	○	○
18. Motivating families to support their children to do well in school.	○	○	○	○	○
19. Motivating students to develop skills through application of classroom concepts.	○	○	○	○	○
20. Motivating student to achieve excellence in scholarship.	○	○	○	○	○
21. Motivating a student to have confidence in their work.	○	○	○	○	○
22. Adjusting lessons to proper levels for individual students.	○	○	○	○	○
23. Using alternative strategies in the classroom.	○	○	○	○	○
24. Using various teaching techniques to meet the needs of students.	○	○	○	○	○
25. Integrating classroom learning with experiential learning.	○	○	○	○	○
26. Incorporating hands-on learning through activities.	○	○	○	○	○
27. Influencing your class size.	○	○	○	○	○
28.Being technically competent in areas of agriculture pertinent to courses offered in the program.	○	○	○	○	○
29. Crafting good questions for students.	○	○	○	○	○
30. Sharing new technologies with the students.	○	○	○	○	○
31. Selecting activities that motivate students.	○	○	○	○	○
32. Recognizing if a student understands complex concepts.	○	○	○	○	○

>>

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Section 2: Informal Settings of FFA and SAE (outside the traditional classroom)

Another aspect of agricultural education takes place outside the traditional classroom in the informal setting (FFA and SAE).

How important are the following teaching behaviors in the informal setting?

	Not Important	Slightly Important	Moderately Important	Very Important	Extremely Important
33. Controlling inappropriate behavior outside the classroom.	○	○	○	○	○
34. Maintaining records for FFA and SAE.	○	○	○	○	○
35. Ensuring the accuracy in chapter rosters.	○	○	○	○	○
36. Ensuring that state and national deadlines are met.	○	○	○	○	○
37. Supervising chapter activities.	○	○	○	○	○
38. Establishing structure to FFA meetings.	○	○	○	○	○
39. Managing relevant SAE programs for students.	○	○	○	○	○
40. Managing an effective alumni chapter.	○	○	○	○	○
41. Developing a well rounded program.	○	○	○	○	○
42. Maintaining logistics involved with SAE.	○	○	○	○	○
43. Ensuring students meet appropriate deadlines.	○	○	○	○	○
44. Helping students learn through experiential learning.	○	○	○	○	○
45. Encouraging student to seek out learning opportunities beyond the classroom.	○	○	○	○	○
46. Encouraging students to seek out a project based on their interest.	○	○	○	○	○
47. Encouraging students to participate on all levels.	○	○	○	○	○
48. Getting total involvement by all chapter members.	○	○	○	○	○
49. Getting students to assume leadership roles.	○	○	○	○	○
50. Getting student to work in the community.	○	○	○	○	○
51. Preparing students for competitive events.	○	○	○	○	○
52. Motivating student citizenship, volunteerism, and patriotism.	○	○	○	○	○
53. Motivating new students and their families to be involved in FFA.	○	○	○	○	○

54. Fostering cooperation between school and community.	○	○	○	○	○
55. Staying informed about FFA programs, events, and resources.	○	○	○	○	○
56. Making SAE requirements understood by students.	○	○	○	○	○
57. Increasing student knowledge about project management.	○	○	○	○	○
58. Increasing student awareness of safety measures.	○	○	○	○	○
59. Increasing student knowledge of leadership.	○	○	○	○	○
60. Locating student references and materials.	○	○	○	○	○
61. Incorporating student references and materials into FFA and SAE activities.	○	○	○	○	○

>>

This page was in the Collegiate Experts Survey

THE UNIVERSITY OF GEORGIA

We would like to develop a profile of the expert panel. Rest assured no names will be revealed. Please answer the following questions to help us develop a profile.

What year were you born?

What is your gender?

- Male
- Female

What is your current title?

- Assistant Professor
- Associate Professor
- Professor
- Department Head
- Instructor
- Assistant Dean
- Associate Dean
- Dean or Director
- Other

How many years have you held a position in the field of Agricultural Education?

- Less than 5 years
- 5-9
- 10-14
- 15-19
- 20-24
- 25-29
- 30-34
- 35+

Did you ever teach in a middle or high school agricultural education program? (if yes, please indicate how many years).

>>

This page was in the Teachers Experts Review

THE UNIVERSITY OF GEORGIA

We would like to develop a profile of the expert panel. Rest assured no names will be revealed. Please answer the following questions to help us develop a profile.

What year were you born?

What is your gender?

- Male
- Female

What is your current title?

- Assistant Professor
- Associate Professor
- Professor
- Department Head
- Instructor
- Assistant Dean
- Associate Dean
- Dean or Director
- Other

How many years have you held a position in the field of Agricultural Education?

- Less than 5 years
- 5-9
- 10-14
- 15-19
- 20-24
- 25-29
- 30-34
- 35+

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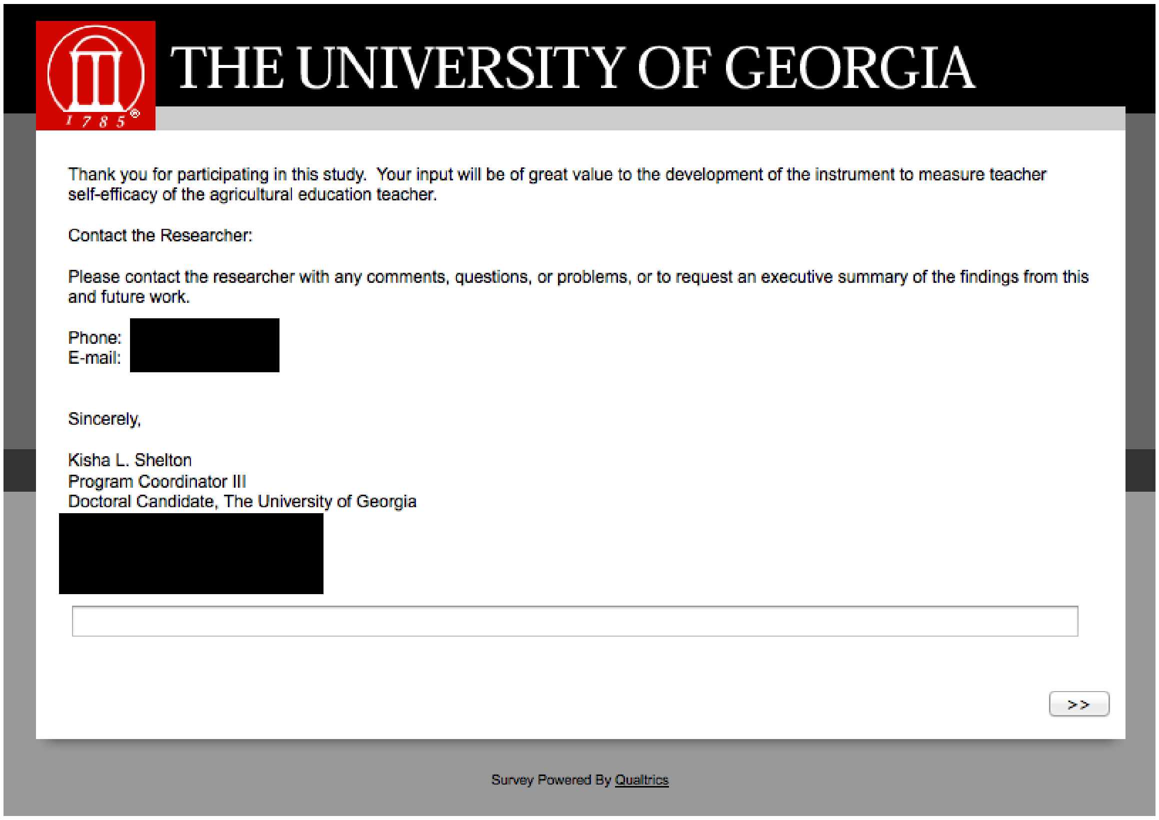

THE UNIVERSITY OF GEORGIA

Thank you for participating in this study. Your input will be of great value to the development of the instrument to measure teacher self-efficacy of the agricultural education teacher.

Contact the Researcher:

Please contact the researcher with any comments, questions, or problems, or to request an executive summary of the findings from this and future work.

Phone: [redacted]
E-mail:

Sincerely,

Kisha L. Shelton
Program Coordinator III
Doctoral Candidate, The University of Georgia
[redacted]

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APPENDIX B

LETTERS OF EXPERT PARTICIPATION

Letter 1

To insure that agricultural education continues to grow and flourish it is important that quality graduates enter into and remain in the teaching field. These students are the result of quality pre-service and post service training for those who plan to enter into the field of agricultural education.

My name is Kisha Shelton and I am a PhD student in the Department of Lifelong Education, Administration, and Policy at The University of Georgia. My doctoral dissertation research is being conducted in the Adult Education program under the direction of Dr. Lorilee Sandmann. I am currently engaged in a study attempting to discover the perceived teacher self-efficacy beliefs of agricultural science education teachers. I am planning to explore the extent to which personal and situational characteristics impact this teacher self-efficacy. This study will be conducted on a national population of teachers. For the actual study I will be asking participants to complete an online survey and then I will tabulate results that will be shared with the field.

As a first step in the study I am trying to establish the validity of the measure I am going to use. In order to measure teacher self-efficacy, I have identified 61 items in the literature as important teaching behaviors that are promising in the measure of teacher self-efficacy taking into consideration the formal traditional classroom teacher role and the informal coach/advisor role found in FFA and SAE. I am now turning to you as an educator in agricultural science education. You have been identified by either professional contact with my outreach program at the University of Georgia or via a recommendation by one of my committee members, Dr. John Ricketts.

Thus, I would like to invite you to participate in an expert review of the instrument created for my dissertation research. In order to conduct the study I am seeking your guidance regarding the instrumentation that has been developed. First, if you would please complete the online survey concerning the teacher behaviors that I have included teacher efficacy instrument. You are going to be asked to rate the importance of these behaviors as they related to formal classroom settings and informal settings of FFA/SAE. Simply follow the link to the survey found below.

Second, I have attached a copy of the constructs we are considering. I will be asking you to consider some questions as you evaluate the instrument.

1. Are the constructs correct? (see constructs listed below)
2. Do I have the right items listed in the instrument? Are items missing or should items be removed?
3. Do you have any comments on improvement?

Thank you for your time and assistance.

Sincerely,

Kisha L. Shelton

Follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
${l://SurveyURL}

Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

Table 1
Definition of Teacher Self-Efficacy Constructs

Construct Name	Definition
Teaching Efficacy Beliefs of Management in the Formal Classroom	The teacher's belief in their capabilities to effectively supervise the classroom in the structured setting of formal learning.
Teaching Efficacy Beliefs for Student Engagement in the Formal Classroom	The teacher's belief in their capabilities to effectively capture the interest of the students in the structured setting of formal learning.
Teaching Efficacy Beliefs for Instructional Strategies in the Formal Classroom	The teacher's belief in their capabilities to effectively utilize tactics, methods, and materials to assist students in achieving an educational goal in the structured setting of formal learning.
Teaching Efficacy Beliefs of Project Management in the Informal Learning Venue	The teacher's belief in their capabilities to effectively supervise the non-classroom activities such as FFA/SAE (informal learning venues).
Teaching Efficacy Beliefs of Student Engagement in the Informal Learning Venue	The teacher's belief in their capabilities to effectively capture the interest and participation of the students in the non-classroom activities such as FFA/SAE (informal learning venues).
Teaching Efficacy Beliefs of Instructional Strategies in the Informal Learning Venue	The teacher's belief in their capabilities to effectively utilize tactics, methods, and materials to assist students in achieving an educational goal in non-classroom activities such as FFA/SAE (informal learning venues).

Letter 2

Dear :

Approximately two weeks ago you received an e-mail inviting you to participate in an expert review of a researcher created instrument to measure teacher self-efficacy. This review will provide much needed data to determine if the instrument can be utilized. I am now turning to you as an educator in agricultural science education. You have been identified by either professional contact with my outreach program at the University of Georgia or via a recommendation by one of my committee members, Dr. John Ricketts.

In order to conduct the study I am seeking your guidance regarding the instrumentation that has been developed. First, if you would please complete the online survey concerning the teacher behaviors that I have included teacher efficacy instrument. You are going to be asked to rate the importance of these behaviors as they related to formal classroom settings and informal settings of FFA/SAE. Simply follow this link to the survey <https://ugeorgia.qualtrics.com/SE/?SID=SV_eXLLwVEbuWqeMe1>.

Second, I have attached a copy of the constructs we are considering. I will be asking you to consider some questions as you evaluate the instrument.

1. Are the constructs correct? (see the attached document)
2. Do I have the right items listed in the instrument? Are items missing or should items be removed?
3. Do you have any comments on improvement?

Thank you for your time and assistance.

Letter 3

Dear   : (If you have already completed the survey, thank you).
The mission of agricultural education is to prepare students for successful careers in the world of global agriculture, food, fiber, and natural resources systems. Successful preparation comes from teachers who have been properly equipped for the education of students. It is so important that we continue to improve on the preparation and continuing education of teachers.

As someone who works in the area of education, I understand that you have many demands on your time. However, I am writing to bring your attention to a survey sent to you on August 15th. You have been chosen as an expert in the field of agricultural education and teacher self-efficacy. Your input on the researcher created instrument which measures teacher self-efficacy specifically in agricultural science educators is invaluable.

I am currently engaged in a research study attempting to discover the perceived teacher self-efficacy beliefs of agricultural science education teachers. I am planning to explore the extent to which personal and situational characteristics impact this teacher self-efficacy. This study will be conducted on a national population of teachers. For the actual study I will be asking participants to complete an online survey and then I will tabulate results that will be shared with the field.

As a first step in the study I am trying to establish the validity of the measure I am going to use. In order to measure teacher self-efficacy, I have identified 61 items in the literature as important teaching behaviors that are promising in the measure of teacher self-efficacy taking into consideration the formal traditional classroom teacher role and the informal coach/advisor role found in FFA and SAE I am now turning to you as an educator in agricultural science education.
You have been identified by either professional contact with my outreach program at the University of Georgia or via a recommendation by one of my committee members, Dr. John Ricketts.

Thus, I would like to invite you to participate in an expert review of the instrument created for my dissertation study. In order to conduct the study I am seeking your guidance regarding the instrumentation that has been developed. First, if you would please complete the online survey concerning the teacher behaviors that I have included teacher efficacy instrument. You are going to be asked to rate the importance of these behaviors as they related to formal classroom settings and informal settings of FFA/SAE. Simply follow this link to the survey
<https://ugeorgia.qualtrics.com/SE/?SID=SV_eXLLwVEbuWqeMe1>.

Second, I have attached a copy of the constructs we are considering. I will be asking you to consider some questions as you evaluate the instrument.

1. Are the constructs correct? (see the attached document)

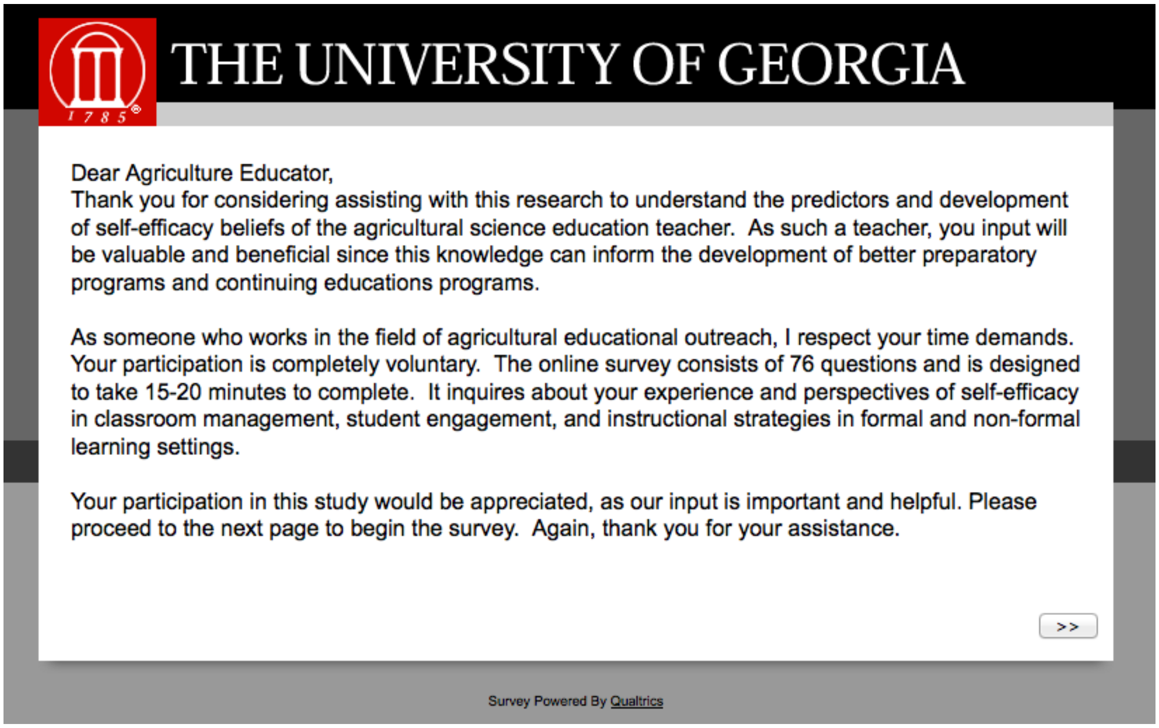
2. Do I have the right items listed in the instrument? Are items missing or should items be removed?

3. Do you have any comments on improvement?

Thank you for your time and assistance.

APPENDIX C

PILOT INSTRUMENT WITH IMPLIED CONSENT FORM



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Dear Agriculture Educator,
Thank you for considering assisting with this research to understand the predictors and development of self-efficacy beliefs of the agricultural science education teacher. As such a teacher, you input will be valuable and beneficial since this knowledge can inform the development of better preparatory programs and continuing educations programs.

As someone who works in the field of agricultural educational outreach, I respect your time demands. Your participation is completely voluntary. The online survey consists of 76 questions and is designed to take 15-20 minutes to complete. It inquires about your experience and perspectives of self-efficacy in classroom management, student engagement, and instructional strategies in formal and non-formal learning settings.

Your participation in this study would be appreciated, as our input is important and helpful. Please proceed to the next page to begin the survey. Again, thank you for your assistance.

>>

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You are being asked to participate in a research study titled *Predictors and Measures of Teacher Efficacy in Agricultural Science Education Teachers*. The purpose of the research is to understand the predictors and development of teacher self-efficacy beliefs of the agricultural science education teacher. Please know the research activity is being conducted by the individual listed below under the supervision of Dr. Lorilee Sandmann and the results may be published.

Kisha L. Shelton
Program Coordinator III
University of Georgia
2105 Miller Plant Science Bldg.
Athens, GA 30602
[redacted]

As a participant in this study, you will be asked to complete an online 76 question survey about your teacher efficacy development. There are no foreseen risks to your participation. Your participation is voluntary. You may refuse to participate or withdraw at anytime without penalty or loss of benefits which you would otherwise be entitled, or skip any question you feel uncomfortable answering. The questionnaire should take 15-20 minutes to complete.

All of your responses will be confidential and will not be associated with your name or e-mail address. However, a unique number will be assigned to each respondent through the use of a "cookie" that has no meaning outside of the survey website. If necessary, this will allow each respondent to return to an incomplete survey and be taken to directly to the point of exit. If the survey remains incomplete the researcher cannot access it and the answers will not be used as part of the study.

Please note: Internet communications are insecure and there is a limit to the confidentiality that be guaranteed, due to the limits of the technology. Be assured that once the researcher receives the completed survey, standard confidentiality procedures will be followed. In addition, no individual data will be reported, only summarized data.

Moreover, if you feel uncomfortable with the risk to privacy with taking an Internet survey, you can complete a PDF version of the survey by hand and then submit via fax [redacted] or US mail at the address above. You can obtain a PDF copy of the survey located at http://www.caes.uga.edu/departments/plantpath/k12/documents/AgTeachEfficacySurvey.pdf.

If you have questions, please contact us: PI Lorilee Sandmann, PH.D., Professor of Adult Education, at [redacted] or [redacted] or CO-PI Ms. Kisha Shelton, Doctoral Candidate in Adult Education, at [redacted] or [redacted].

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

Please indicate your participation

- Yes, I give consent to participate in this study.
- No, I do not give consent to participate in this study.

>>

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Section 1: Perceived teaching efficacy beliefs of **management in the formal classroom**.
The teacher's belief in their capabilities to effectively supervise the classroom in the structured setting of formal learning.

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
1. Controlling disruptive behavior in the classroom.	○	○	○	○	○
2. Minimizing inappropriate classroom behavior.	○	○	○	○	○
3. Getting students to follow appropriate classroom behavior.	○	○	○	○	○
4. Maintaining the classroom time.	○	○	○	○	○
5. Making expectations clear about student behavior in the classroom.	○	○	○	○	○
6. Enforcing rules that you have established.	○	○	○	○	○
7. Developing performance based assessments for students.	○	○	○	○	○
8. Ensuring that classroom records are maintained.	○	○	○	○	○
9. Establishing a classroom management system with each class.	○	○	○	○	○

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Section 2: Perceived teaching efficacy beliefs for **student engagement in the formal classroom**.
The teacher's belief in their capabilities to effectively capture the interest of the students in the structured setting of formal learning.

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
10. Encouraging students to think globally.	○	○	○	○	○
11. Encouraging students to think critically.	○	○	○	○	○
12. Encouraging students to face challenges.	○	○	○	○	○
13. Improving the understanding of students who are failing.	○	○	○	○	○
14. Getting through to the most difficult students.	○	○	○	○	○
15. Motivating students who are not engaged in school work.	○	○	○	○	○
16. Provoking students to inquire.	○	○	○	○	○
17. Motivating students to utilize teamwork.	○	○	○	○	○
18. Motivating families to support their children to do well in school.	○	○	○	○	○
19. Motivating students to develop skills through experiential learning.	○	○	○	○	○
20. Motivating students to achieve excellence in scholarship.	○	○	○	○	○
21. Motivating students to have confidence in their work.	○	○	○	○	○

>>

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Section 3: Perceived teacher self-efficacy for **instructional strategies in the formal classroom**.
The teacher's belief in their capabilities to effectively utilize tactics, methods, and materials to assist students in achieving an educational goal in the structured setting of formal learning.

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
22. Adjusting lessons to meet learning needs of students.	○	○	○	○	○
23. Using alternative strategies in the classroom.	○	○	○	○	○
24. Using various teaching techniques to meet the needs of students.	○	○	○	○	○
25. Integrating classroom learning with experiential learning.	○	○	○	○	○
26. Incorporating hands-on learning through activities.	○	○	○	○	○
27. Matching class size with learning outcomes.	○	○	○	○	○
28. Incorporating the most current content into lessons.	○	○	○	○	○
29. Utilizing updated instructional strategies with students.	○	○	○	○	○
30. Sharing new technologies with students.	○	○	○	○	○
31. Selecting activities that motivate students.	○	○	○	○	○
32. Making sure students understand complex concepts.	○	○	○	○	○
33. Crafting good questions for students.	○	○	○	○	○

>>

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Section 4: Perceived teacher self-efficacy beliefs of **project management in the informal setting of FFA/Supervised Agricultural Experience (SAE)**.
The teacher's belief in their capabilities to effectively supervise the non-classroom activities such as FFA/SAE (informal learning venues).

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
34. Controlling inappropriate behavior outside the classroom.					
35. Maintaining the records for FFA.					
33. Maintaining the records for SAE.					
34. Ensuring the accuracy in FFA chapter rosters.					
35. Ensuring the state and national deadlines are met (FFA, SAE, other).					
36. Supervising FFA chapter activities.					
37. Establishing structure to FFA meetings.					
38. Managing relevant SAE programs for students.					
39. Managing an FFA alumni chapter engaged with students.					
40. Developing an engaging (well-rounded) FFA program (active with any of the following local community, school, and national organization).					
41. Maintaining logistics involved with SAE.					
42. Ensuring students meet appropriate FFA/SAE deadlines.					

>>

THE UNIVERSITY OF GEORGIA

Section 5: Perceived teacher self-efficacy beliefs of **student engagement in the informal settings of FFA/Supervised Agricultural Experience (SAE)**.
The teacher's belief in their capabilities to effectively capture the interest and participation of the students in the non-classroom activities such as FFA/SAE (informal learning venues).

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
43. Helping students learn through experiential learning.	○	○	○	○	○
44. Encouraging students to seek out learning opportunities beyond the classroom.	○	○	○	○	○
45. Encouraging students to seek out a project based on their interest.	○	○	○	○	○
46. Encouraging students to assume leadership roles.	○	○	○	○	○
47. Encouraging students to work in the community.	○	○	○	○	○
48. Encouraging students to be involved in competitions.	○	○	○	○	○
49. Getting students to assume leadership roles.	○	○	○	○	○
50. Getting students to work in the community.	○	○	○	○	○
51. Getting students to participate in competitive events.	○	○	○	○	○
52. Motivating student citizenship.	○	○	○	○	○
53. Motivating new students to be involved in FFA.	○	○	○	○	○
54. Motivating new students' families to be involved in FFA.	○	○	○	○	○
55. Fostering cooperation between school FFA chapter and local communities.	○	○	○	○	○

>>

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Perceived teacher self-efficacy beliefs for **instructional strategies in the informal setting of FFA/Supervised Agricultural Experience (SAE)**.

The teacher's belief in their capabilities to effectively utilize tactics, methods, and materials to assist students in achieving an education goal in non-classroom activities such as FFA/SAE (informal learning venues).

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
56. Staying informed about FFA activities (programs, events, and resources).	○	○	○	○	○
57. Making SAE requirements understood by students.	○	○	○	○	○
58. Increasing student knowledge about SAE project management.	○	○	○	○	○
59. Increasing student awareness of safety measures.	○	○	○	○	○
60. Increasing student knowledge of leadership.	○	○	○	○	○
61. Locating student references and materials.	○	○	○	○	○
62. Incorporating student references and materials into FFA and SAE activities.	○	○	○	○	○

>>

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Section 9: Demographics
Please answer the following questions regarding personal information.

63. What year were you born?

64. What is your race/ethnicity?

65. How many years of teaching Agricultural Education have you completed?

66. Do you have an undergraduate degree in Agricultural Education?

- Yes
- No

67. At what level did you receive certification to teach Agricultural Education?

- Bachelor's Degree
- Master's Degree
- Alternative Certification Route
- Other (please indicate)

68. What is the highest educational degree you have attained?

- Bachelor's Degree
- Master's Degree
- Specialist Degree
- Doctorate
- Other (please indicate)

69. Were you a member of FFA in middle and/or high school?

- Yes
- No

70. Is teaching agricultural education a second career?

- Yes, please enter previous career in box.
- No

71. At which level are you an agricultural education teacher?

- Elementary School
- Middle School
- High School
- Both middle and high school
- All three levels, elementary school, middle school, and high school.

Please indicate your agreement with the following items:

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
72. I feel fairly satisfied with my present job.					
73. Most days I am enthusiastic about my work.					
74. Each day of work seems like it will never end.					
75. I find real enjoyment in my work.					
76. I consider my job rather unpleasant.					

Please feel free to share any critique of the survey. Do you have any additional questions that we should consider for the instrument? (please be sure to click the arrows at the bottom to proceed to the final page).

>>

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Thank you for participating in this study. Your input will be of great value in better understanding the needs of the agricultural education teachers. To ensure the completion of this survey please be sure to click the arrows at the bottom right of this page.

Please contact the researcher with any comments, questions, or problems, or to request an executive summary of findings from this or future work.

Phone: [redacted]
E-mail:

Sincerely,

Kisha L. Shelton
Program Coordinator III Department of Plant Pathology
Doctoral Candidate, Department of Lifelong Education, Administration and Policy, The University of Georgia
[redacted]

>>

APPENDIX D

LETTERS SENT TO PILOT PARTICIPANTS

Letter 1

Dear Agriculture Science Educator:

Teachers enter the classroom from many different routes and often bring varying levels of experience to their teaching. In an effort to better understand what teachers need from preparatory training and from the further training of continuing education, it is necessary to understand how teachers develop the beliefs in their capabilities. Agricultural science educational teachers are unique as their responsibilities extend beyond the traditional classroom setting to that of FFA and SAE. This unique combination formal and nonformal educator presents some difficulty in insuring that teachers feel competent and ready for the classroom.

I am writing to request your participation in this research to identify factors influencing teacher efficacy development in agriculture education teachers. Your input will be incredibly valuable to the understanding of how individuals develop their teacher efficacy beliefs. The results will benefit agricultural science education teachers as this knowledge can be used in the development of better preparatory programs and continuing education programs.

As someone who works in the field of educational outreach, I fully respect the value of your time. Your participation is completely voluntary. The online survey consists of 75 questions and is designed to take 15-20 minutes to complete. I appreciate your consideration for this study, as your input is invaluable.

To complete the survey, simply follow the link to the survey. I personally guarantee the confidentiality of your responses.
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Or copy and paste the URL below into your internet browser:
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Sincerely,

Kisha L. Shelton
Doctoral Candidate, Adult Education

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

Follow the link to opt out of future emails:
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Letter 2

Dear Agricultural Science Educator:

The summer break is a busy one for those involved in agricultural education and it is upon many of us. As someone who works with many different educators, I fully respect just how limited your time is. This is a follow up to an e-mail you received on May 27, 2014, requesting your participation in a survey of agricultural science education teachers.

One of the best rewards for an agricultural science education teacher is seeing how your influence has helped to create successful students. However it is important that a teacher possess the skills and efficacy beliefs to obtain the goals of successful students. I am currently conducting a research study concerning the development of teacher efficacy. This study hopes to understand how effacious teachers are developed and is part of my doctoral studies at the University of Georgia, under the direction of Dr. Lorilee Sandmann.

Your input is greatly appreciated and important to the better understanding of developing strong and well-trained/prepared teachers. Again, I recognize the limits of your time. Your participation in this study is strictly voluntary and your responses will be confidential. Only the summary data will be reported. The survey consists of 75 questions and is designed to take about 15-20 minutes to complete. I appreciate your consideration to participate in this study.

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Letter 3

Dear Agricultural Science Education Teacher,

Some of the most influential people I have known in my life were the very teachers charged with providing me with knowledge exploration, guidance, and discipline. As a teacher, you have the chance to be someone else's influential person. It is important for us to understand what helps a teacher in the development of their teacher efficacy, if we strive to create more successful agricultural science education programs. I know and fully respect how busy you are during this time of the school year. However, I am writing to bring to your attention to a survey participation request you received on June 10, 2014.

I am currently conducting a research study concerning the development of teacher efficacy. This study hopes to understand how effacious teachers are developed. This study and is part of my doctoral studies at the University of Georgia, under the direction of Dr. Lorilee Sandmann.

Your input is greatly appreciated and important to the better understanding of developing strong and well-trained/prepared teachers. Again, I recognize the limits of your time. Your participation in this study is strictly voluntary and your responses will be confidential. Only the summary data will be reported. The survey consists of 76 questions and is designed to take about 15-20 minutes to complete. I appreciate your consideration to participate in this study.

To complete the survey, simply follow the link to the survey. I personally guarantee the confidentiality of your responses.

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APPENDIX E

FINAL INSTRUMENT

AGRICULTURAL EDUCATION TEACHER SELF-EFFICACY SURVEY WITH IMPLIED CONSENT FORM

THE UNIVERSITY OF GEORGIA

Dear Agriculture Educator,
Thank you for considering assisting with this research to understand the predictors and development of self-efficacy beliefs of the agricultural science education teacher. As such a teacher, you input will be valuable and beneficial since this knowledge can inform the development of better preparatory programs and continuing educations programs.

As someone who works in the field of agricultural educational outreach, I respect your time demands. Your participation is completely voluntary. The online survey consists of 73 questions and is designed to take 15-20 minutes to complete. It inquires about your experience and perspectives of self-efficacy in classroom management, student engagement, and instructional strategies in formal and non-formal learning settings.

Your participation in this study would be appreciated, as our input is important and helpful. Please proceed to the next page to begin the survey. Again, thank you for your assistance.

>>

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THE UNIVERSITY OF GEORGIA

You are being asked to participate in a research study titled *Predictors and Measures of Teacher Efficacy in Agricultural Science Education Teachers*. The purpose of the research is to understand the predictors and development of teacher self-efficacy beliefs of the agricultural science education teacher. Please know the research activity is being conducted by the individual listed below under the supervision of Dr. Lorilee Sandmann and the results may be published.

Kisha L. Shelton
Program Coordinator III
University of Georgia
2105 Miller Plant Science Bldg.
Athens, GA 30602
[redacted]

As a participant in this study, you will be asked to complete an online 74 question survey about your teacher efficacy development. There are no foreseen risks to your participation. Your participation is voluntary. You may refuse to participate or withdraw at anytime without penalty or loss of benefits which you would otherwise be entitled, or skip any question you feel uncomfortable answering. The questionnaire should take 15-20 minutes to complete.

All of your responses will be confidential and will not be associated with your name or e-mail address. However, a unique number will be assigned to each respondent through the use of a "cookie" that has no meaning outside of the survey website. If necessary, this will allow each respondent to return to an incomplete survey and be taken to directly to the point of exit. If the survey remains incomplete the researcher cannot access it and the answers will not be used as part of the study.

Please note: Internet communications are insecure and there is a limit to the confidentiality that be guaranteed, due to the limits of the technology. Be assured that once the researcher receives the completed survey, standard confidentiality procedures will be followed. In addition, no individual data will be reported, only summarized data.

Moreover, if you feel uncomfortable with the risk to privacy with taking an Internet survey, you can complete a PDF version of the survey by hand and then submit via fax ([redacted]) or US mail at the address above. You can obtain a PDF copy of the survey located at http://www.caes.uga.edu/departments/plantpath/k12/documents/AgTeacherEfficacyStudy1.pdf.

If you have questions, please contact us: PI Lorilee Sandmann, PH.D., Professor of Adult Education, at [redacted] or [redacted] or CO-PI Ms. Kisha Shelton, Doctoral Candidate in Adult Education, at [redacted] or [redacted].

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu

Please indicate your participation

- ○ Yes, I give consent to participate in this study.
- ○ No, I do not give consent to participate in this study.

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Section 1: Perceived teaching efficacy beliefs of **management in the traditional classroom**.
The teacher's belief in their capabilities to effectively supervise the classroom in the structured setting of formal learning.

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
1. Controlling disruptive behavior in the classroom.	○	○	○	○	○
2. Minimizing inappropriate classroom behavior.	○	○	○	○	○
3. Getting students to follow appropriate classroom behavior.	○	○	○	○	○
4. Maintaining the classroom time.	○	○	○	○	○
5. Making student classroom behavior expectations clear.	○	○	○	○	○
6. Enforcing rules that you have established.	○	○	○	○	○

<< >>

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Section 2: Perceived teaching efficacy beliefs for **student engagement in the tradiational classroom**.
The teacher's belief in their capabilities to effectively capture the interest of the students in the structured setting of formal learning.

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
7. Encouraging students to think globally.	○	○	○	○	○
8. Encouraging students to think critically.	○	○	○	○	○
9. Encouraging students to face challenges.	○	○	○	○	○
10. Provoking students to inquire.	○	○	○	○	○
11. Making sure students understand complex concepts.	○	○	○	○	○
12. Crafting good questions for students.	○	○	○	○	○

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Section 3: Perceived teacher self-efficacy for **instructional strategies in the formal classroom**.
The teacher's belief in their capabilities to effectively utilize tactics, methods, and materials to assist students in achieving an educational goal in the structured setting of formal learning.

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
13. Adjusting lessons to meet learning needs of students.	○	○	○	○	○
14 Using alternative strategies in the classroom.	○	○	○	○	○
15. Using various teaching techniques to meet the needs of students.	○	○	○	○	○
16. Integrating classroom learning with experiential learning.	○	○	○	○	○
17. Incorporating hands-on learning through activities.	○	○	○	○	○
18. Incorporating the most current content into lessons.	○	○	○	○	○

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Section 4: Perceived teacher self-efficacy beliefs of **Student FFA/Supervised Agricultural Experience (SAE) Engagement outside the traditional classroom**
The teacher's belief in their capabilities to effectively capture the interest and participation of students in non-classroom activities such as FFA/SAE.

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
19. Helping students learn through experiential learning.	○	○	○	○	○
20. Encouraging students to seek out learning opportunities beyond the classroom.	○	○	○	○	○
21. Encouraging students to seek out a project based on their interest.	○	○	○	○	○
22. Encouraging students to assume leadership roles.	○	○	○	○	○
23. Encouraging students to work in the community.	○	○	○	○	○
24. Getting students to assume leadership roles.	○	○	○	○	○

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Section 5: Perceived teacher self-efficacy beliefs of **Student and Stakeholders FFA/SAE Engagement outside the traditional classroom.**
The teacher's belief in their capabilities to effectively capture the interest and participation of the students and stakeholders in the non-classroom activities such as FFA/SAE.

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
25. Encouraging students to be involved in competitions.	○	○	○	○	○
26. Getting students to work in community.	○	○	○	○	○
27. Getting students to participate in competitive events.	○	○	○	○	○
28. Motivating student citizenship.	○	○	○	○	○
29. Motivating new students to be involved in FFA.	○	○	○	○	○
30. Motivating new students' families to be involved in FFA.	○	○	○	○	○
31. Fostering cooperation between school FFA chapter and local communities.	○	○	○	○	○

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Section 6: Perceived teacher self-efficacy beliefs for **your role as the FFA Advisor** outside of the traditional classroom.
The teacher's belief in their capabilities to effectively serve as an advisor to students in non-classroom activities such as FFA.

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
32. Maintaining the records of FFA.	○	○	○	○	○
33. Ensuring the accuracy in FFA chapter rosters.	○	○	○	○	○
34. Ensuring the state and national deadlines are met (FFA, SAE, other).	○	○	○	○	○
35. Supervising FFA chapter activities.	○	○	○	○	○
36. Establishing a structure to FFA meeting.	○	○	○	○	○
37. Developing an engaging (well-rounded) FFA program (active with any of the following local community, school, national organization).	○	○	○	○	○
38. Ensuring students meet appropriate FFA/SAE deadlines.	○	○	○	○	○
39. Staying informed about FFA activities (programs, events, and resources).	○	○	○	○	○

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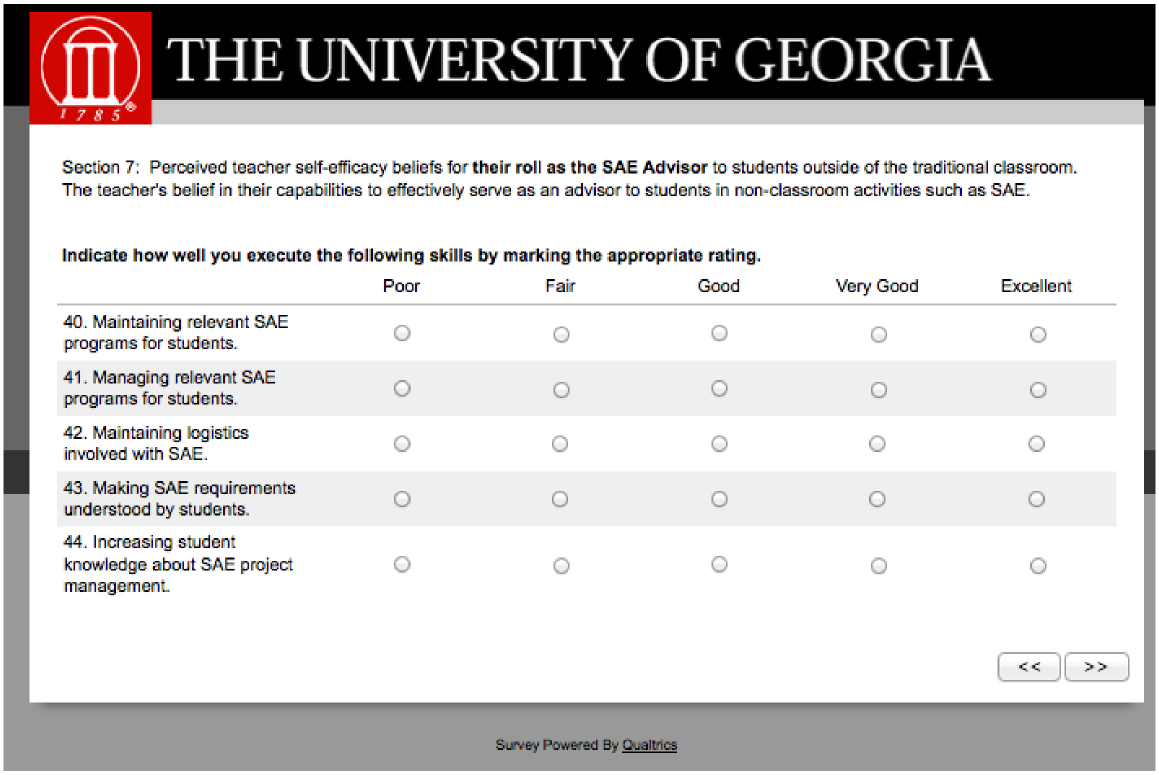

THE UNIVERSITY OF GEORGIA

Section 7: Perceived teacher self-efficacy beliefs for **their roll as the SAE Advisor** to students outside of the traditional classroom. The teacher's belief in their capabilities to effectively serve as an advisor to students in non-classroom activities such as SAE.

Indicate how well you execute the following skills by marking the appropriate rating.

	Poor	Fair	Good	Very Good	Excellent
40. Maintaining relevant SAE programs for students.	○	○	○	○	○
41. Managing relevant SAE programs for students.	○	○	○	○	○
42. Maintaining logistics involved with SAE.	○	○	○	○	○
43. Making SAE requirements understood by students.	○	○	○	○	○
44. Increasing student knowledge about SAE project management.	○	○	○	○	○

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Section 9: Demographics
Please answer the following questions regarding personal information.

45. In what **year** were you born?

46. How **many years of teaching Agricultural Education** have you completed?

47. How **long** have you been **teaching at your current school?**

48. Do you have an **undergraduate degree in Agricultural Education**?

- Yes
- No

49. At which **academic level** were you when you received **Agricultural Education certification**?

- Bachelor's Degree
- Master's Degree
- Alternative Certification Route
- Other (please indicate)

50. What is the **highest educational degree** you have attained?

- Bachelor's Degree
- Master's Degree
- Specialist Degree
- Doctorate
- Other (please indicate)

51. Were you a **member of FFA** in middle and/or high school?

- Yes
- No

52. Is **teaching agricultural education a second career?**

- Yes, please enter previous career in box.
- No

53. At **which level** are you an **agricultural education teacher**?

- Elementary School
- Middle School
- High School
- Both middle and high school
- All three levels, elementary school, middle school, and high school.

Please indicate **your agreement with the following items**:

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
54. I feel fairly satisfied with my present job.	○	○	○	○	○
55. Most days I am enthusiastic about my work.	○	○	○	○	○
56. Each day of work seems like it will never end.	○	○	○	○	○
57. I find real enjoyment in my work.	○	○	○	○	○
58. I consider my job rather unpleasant.	○	○	○	○	○

Please indicate **to what degree you feel your school provides**:

	Not at all	Some, but not enough	Enough
59. Equipment for all your classes?	○	○	○
60. Space for all your classes?	○	○	○
61. Funding for all your classes?	○	○	○

Please indicate **to what degree do you feel your school supports**:

	Not at all	Some, but not enough	Enough
62. Your agriculture education program?	○	○	○
63. You/Your students' FFA activities?	○	○	○
64. You/ Your students' SAE activities?	○	○	○

Please indicate **to what degree do you feel your supervisor supporst you as an**:

	Not at all	Some, but not enough	Enough
65. Agriculture education teacher?	○	○	○
66. FFA advisor?	○	○	○
67. SAE advisor?	○	○	○

Please indicate **how often use each of the following teaching practices**:

	Never	Sometimes	Always
68. Hands-on activities to teach agricultural education concepts.	○	○	○
69. A rigorous curriculum.	○	○	○
70. Current instructional technology.	○	○	○

To what extent do you agree with the following statements?

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
71. My agriculture education program impacts my students' overall educational experience.	○	○	○	○	○	○
72. My agriculture education program increase my students' academic skills.	○	○	○	○	○	○
73. My agriculture education program increased my students' leadership skills.	○	○	○	○	○	○

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THE UNIVERSITY OF GEORGIA

Thank you for participating in this study. Your input will be of great value in better understanding the needs of the agricultural education teachers. To ensure the completion of this survey please be sure to click the arrows at the bottom right of this page.

Please contact the researcher with any comments, questions, or problems, or to request an executive summary of findings from this or future work.

Phone: [redacted]
E-mail:

Sincerely,

Kisha L. Shelton
Program Coordinator III Department of Plant Pathology
Doctoral Candidate, Department of Lifelong Education, Administration and Policy, The University of Georgia
[redacted]

<< >>

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APPENDIX F

INVITATION OF PARTICIPATION LETTERS

Letter 1

Dear Agriculture Science Educator:

Teachers enter the classroom from many different routes and often bring varying levels of experience to their teaching. In an effort to better understand what teachers need from preparatory training and from the further training of continuing education, it is necessary to understand how teachers develop the beliefs in their capabilities. Agricultural science educational teachers are unique as their responsibilities extend beyond the traditional classroom setting to that of FFA and SAE. This unique combination formal and nonformal educator presents some difficulty in insuring that teachers feel competent and ready for the classroom.

I am writing to request your participation in this research to identify factors influencing teacher efficacy development in agriculture education teachers. Your input will be incredibly valuable to the understanding of how individuals develop their teacher efficacy beliefs. The results will benefit agricultural science education teachers as this knowledge can be used in the development of better preparatory programs and continuing education programs.

As someone who works in the field of educational outreach, I fully respect the value of your time. Your participation is completely voluntary. The online survey consists of 73 questions and is designed to take 15-20 minutes to complete. I appreciate your consideration for this study, as your input is invaluable.

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Letter 2

Dear Agricultural Science Educator:

The spring semester is a busy one for those involved in agricultural education and it is ending for many of us. As someone who works with many different educators, I fully respect just how limited your time is. This is a follow up to an e-mail you received on May 12, 2015, requesting your participation in a survey of agricultural science education teachers.

One of the best rewards for an agricultural science education teacher is seeing how your influence has helped to create successful students. However it is important that a teacher possess the skills and efficacy beliefs to obtain the goals of successful students. I am currently conducting a research study concerning the development of teacher efficacy. This study hopes to understand how effacious teachers are developed and is part of my doctoral studies at the University of Georgia, under the direction of Dr. Lorilee Sandmann.

Your input is greatly appreciated and important to the better understanding of developing strong and well-trained/prepared teachers. Again, I recognize the limits of your time. Your participation in this study is strictly voluntary and your responses will be confidential. Only the summary data will be reported. The survey consists of 73 questions and is designed to take about 15-20 minutes to complete. I appreciate your consideration to participate in this study.

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Letter 3

Dear Agricultural Science Education Teacher,

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APPENDIX G

OTHER METHODS TO CERTIFCATION

Appendix G

Other routes to certification used by Agricultural Education Teachers

Type of Certification
AA
Class 4 Certification
Ph.D.
Post Bachelor’s Alternative Route
Teaching College Course While Obtaining my Master’s in Ag Ed

APPENDIX H

OTHER HIGHEST DEGREES OBTAINED

Appendix H

Other Highest Degrees Obtained

Types of Education
Pursing a PhD, will complete in May 2018
Plus almost 50 credits. (Politics and cuts to public education do not benefit teachers to get a masters if teaching in rural America. If you have a masters and are looking for a job in rural America, you are less employable)
MS Ag Ed to be complete 2016
Masters plus add on for administration
Master plus the equivalent of 2 more masters in credits
I have 2 masters: 1 in Ag Science and 1 in Educational Administration
I am currently completing my thesis to earn my MS in Ag Ed
Finishing BS this year
Class 4 certification AA general studies and 3 years college MSU Bozeman
Bachelor's Degree with Certification and 3/4 of Masters finished
B S plus 30
AA
6th year degree in educational leadership
30 hours graduate work
2 Master's degrees
1 year of master's program remaining

APPENDIX I

FIRST CAEERS OF SECOND CAREER AGRICULTURAL EDUCATION

TEACHERS

Appendix I

First Careers of Teachers Reporting Agricultural Education as a Second Career

First Careers			
4-H community educator	Business teacher/Construction company owner	Horse shoer (farrier)	Sales
4-H Coordinator	Cheese production management	I also Farm	Sales & distribution
4-H Extension Agent, 2 County Extension Director	Coaching College Athletics	I ranch also	Sales/management
Ag Sales	Construction	I started as an Ag Teacher farmed for 28+ years and returned to teaching	Science teacher
Ag science instructor	Cooperative Extension Service	Instructor & Academic Advisor, College of Agricultural Sciences, Colorado State University	Self employed
Ag. engineer	Corrections	Last 38 yrs full time farmer 1/2 ag teacher	Started as a teacher, then joined the Peace Corps, worked for EPA, and Engineering Firm as a scientist
Agricultural crop protection sales representative	County Extension Agent - Feed Sales	Lawn Care service and sales	Supervisor for chemical application company
Agricultural sales	Dairy Farmer	Logger	Teach music - choir, guitar and orchestra

Table Appendix I.1 continued

Agriculture advocacy	Dairy manager	Military	United States Marine
Agriculture input sales	Elementary Teacher	Mill worker, farm hand, truck driver	Veterinary Technician
Agricultural research with the USDA/UofA	Extension Specialist	NRCS	Vocational Rehabilitation Evaluator
Always been a teacher. Currently teaching middle and high school.	Farm Manager	Pastoral Counseling	Winemaker
Assistant manager 300 arce fruit farm, Dairy	Farmer	Production farmer	Worked in Agribusiness
Automotive paint and body shop supply sales.	Farming	Rancher	Worked the Toledo Zoo
Beef promotion, agricultural buyer, and ag teacher before that	Farming/Ranching	Rancher	Wyoming Department of Agriculture Inspector
Biology teacher	Fee	Rancher	
Business	Food Technologist	Retail Sales & Management	