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Communication Qualities of Graduate Advisors from the Point of View of Graduate Students in Departments of Agricultural Leadership, Education, Extension, and Communications

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RPA 5 of the National Research Agenda: Efficient and Effective Agricultural Education Programs

Communication Qualities of Graduate Advisors from the Point of View of Graduate Students in Departments of Agricultural Leadership, Education, Extension, and Communications

Abstract

The connection between an advisor and advisee is dependent on many factors. According to the mentoring-empowered model, the advisor plays the roles of: teacher, sponsor and socializer, counselor, role model, and encourager. Based on the mentoring-empowered model, an open line of communication needs to be present, a sense of trust must exist, openness between the advisor and the graduate student is crucial, the graduate student needs to feel accepted, and graduate student growth needs to be at the forefront of many conversations. This study examined attributes of graduate advisors as it sought to determine both high and low qualities of graduate advisors. Accordingly, there are various thoughts on what graduate students perceive as a high-quality advisor versus a low-quality advisor. Among many traits, graduate students state that high-quality advisors will be readily available to assist them and are honest with them. Additionally, the results revealed that high-quality advisors are knowledgeable about their field. Likewise, a low-quality advisor is one who is difficult to reach, expresses little or no encouragement to the graduate student, and who possesses little knowledge about his or her field.

Introduction

In a 1998 study by Harvard University faculty (Powell), lack of communication was identified as a recurring theme among graduate students and advisors who participated in a roundtable discussion examining relationships and communication trends between the two. In the same study, many of the graduate students did not know the director of graduate studies in their department and many faculty members were unaware of important developments among the graduate student community (Powell, 1998). While instances such as may be rare, it demonstrates the lack of communication that can potentially exist among faculty and graduate students in a particular graduate program.

There are many other potential problems that can stem from lack of communication and result in the majority of the friction between graduate students and their advisors (Repak, n.d.). Further, when little or no dialogue exists between a graduate student and their advisor, problems will likely occur. In most graduate programs, there is little or no emphasis placed on open communication between faculty and graduate students by administration. To add to the problem, most students tend to avoid breaking down communication barriers between themselves and graduate advisors when relationships turn sour or are not as open as they originally may have been (Repak, n.d.). To remedy this issue, many universities have a set of guidelines advisors and graduate students should adhere to when entering the graduate student/advisor relationship. For example, the University of Delaware, College of Engineering Graduate Student Handbook describes in detail how the graduate student and advisor should communicate. More specifically, the administration suggests graduate students should be proactive in communicating with their advisor. Also, graduate students should be open to trying other communication modes and expect things to not work the first time.

In a 2006 study (Knox, Schlosser, Pruitt, & Hill) examining graduate advising relationships from the advisor perspective, the authors found positive relationships between advisors and graduate students were characterized by open communication. This was depicted by an advisor who felt he or she was comfortable enough with the graduate student to work through any situations in which the graduate student was upset. Graduate students in agricultural leadership, education, extension, and communications departments believe their "…advisors possess a student-oriented attitude and are open and willing to converse with [them] about academic endeavors as well as personal problems" (Gill, Russell, & Rayfield., 2012, p. 12). Knox et al., (2006) also found difficult advising relationships were characterized by poor communication and open communication was present in good advising relationships. In one particular instance regarding poor communication, an advisor reported his or her advisee refused to keep her informed regarding actions concerning his or her dissertation. According to Gill et al., (2012) graduate students in departments of agricultural leadership, education, extension, and communications are satisfied with the relationship they have with their advisor.

Historically, the advising relationship between advisor and graduate student has been known as a private affair. In particular, De Welde and Laursen (2008) describe the relationship between graduate student and advisor by citing George Walker, director of the Carnegie Initiative, "Only the American bedroom has more privacy associated with it than the relationship between the faculty member and the Ph.D. student" (p. 39).While this comment may be extreme in some senses, the comment highlights how advising is commonly understood as a private affair among the graduate student and the advisor. During the literature review process numerous factors surfaced as areas of concern or emphasis when referring to communication between a graduate student and their advisor. Communication competence (Ruben & Martin, 1992; Wrench & Punyanunt, 2004), encouragement (De Welde & Laursen, 2008; Williams, 2000), career advice (De Welde & Laursen, 2008; Schlosser, Knox, Moskovitz, & Hill, 2003), mentoring (De Welde & Laursen, 2008; Repak, n.d.), and support and guidance (De Welde & Laursen, 2008; Schlosser & Moskovitz, 2003) are factors that surfaced in previous graduate student/advisor relationship studies. These five factors will serve as the structure for the literature review.

Communication Competence

The ways in which the graduate student and advisor understand the meaning and the deciding factors of the communication process are vital to the advising relationship. The competence of such communication can determine the success or failure of said relationship. Communication competence is a series of specific behaviors: self-disclosure, empathy, social relaxation, assertiveness, interaction management, altercentrism, expressiveness, supportiveness, immediacy, and environmental control (Ruben & Martin, 1992). In a 1993 study examining levels of communication competence among advisors and graduate students conducted by Ruben et al., the researchers found individuals who did not believe in their own communicative abilities had a lower interpersonal communication score, which in turn, created lower ratings of satisfaction with interpersonal reactions (Wrench & Punyanunt, 2004). The results of Wrench and Punyanunt's (2004) study showed the necessity of competent communication between advisors and advisees makes sense. The authors go on to state if an advisor is incompetent in his or her attempts at communicating with the advisee, the advisee would not get as much out of the relationship as he or she could with an advisor who is competent in his or her communication skills.

Encouragement

Encouragement can also heavily influence the success of the time spent in graduate school for a student. An emerging characteristic of De Welde and Laursen's (2008) study, which sought to identify the *ideal advisor,* was an advisor who was encouraging to his or her graduate students. In fact, students on the receiving end of encouragement reported feeling a greater connection to their particular discipline and reported greater motivation to complete graduate school in a timely manner. These same graduate students were also more confident in discussing ideas with their peers and faculty and made greater contributions to the knowledge in their fields. In his 2000 dissertation studying demandingness and responsiveness of advisors as determinants of graduate students, Williams found high responsiveness was important to the graduate student's experience. Supportive behaviors such as being attentive and interested in the student's progress appeared to be imperative to the overall success of a graduate student. According to Gill et al., (2012) graduate advisors in departments of agricultural leadership, education, extension, and communications met with their graduate students on a regular basis and during scheduled meetings at least once a week.

On the other hand, without adequate amounts of responsiveness, students appeared to feel overwhelmed by the process and in some cases students had the feeling of not being wanted. Moreover, many students in the study also felt neglected when they perceived their advisors to be too busy to give them adequate attention. Williams (2000) goes on to recommend advisors should be "available and responsive to their students' needs, while remaining flexible so as to accommodate different levels of independence in individual students" (p. 97).

Having the opportunity to participate in professional development events also has a positive effect on the graduate career. More specifically, encouragement to participate in professional conferences and introductions to people at conferences typically occur in the satisfied advising relationship and not in the unsatisfied ones. In a study done by Gill et al., (2012), graduate advisors within the Agriculture Education profession encourage graduate student involvement in both student organizations and professional organizations. These advisor attributes are likely to communicate the advisor's interest in the student's career. For unsatisfied students, whose advisors tended to not encourage conference participation, the advisor may have been perceived as not caring about the student's career (Schlosser et al., 2003).

Career Advice

One of the greatest types of communication between an advisor and an advisee comes in the way of career advice from the graduate advisor. De Welde and Laursen's (2008) study found the best advisors were aware of when their students were ready to receive career advice. The advisors also tailored their advice to the particular student's career goals and integrate their students into his/her professional networks. In doing so, this allows the student to consider other options for careers. It also opens the door for students to become acquainted with influential scholars and identify other funding opportunities that may not have previously been considered by the graduate student. Further, the *ideal type* of advisor reflects a set of traits that will help their students confidently make the transition into the professional world. Schlosser et al., (2003) found a significant difference between satisfied and unsatisfied graduate students when discussing the overall satisfaction of the career advice and guidance they received from their advisor. When looking at career guidance in the relationship, satisfied students typically received such guidance, whereas graduate students who were unsatisfied typically did not receive the same career advice. Thus, the absence of career advice was an important loss for the students; proven by some of the participants' remarks in the study. As a result, researchers subsequently found that the lack of career guidance appears to have contributed to students' dissatisfaction with the advising relationship.

Mentoring

Repak (n.d.) defined a mentor as, "a person with superior rank or authority and influence in his or her field who commits time, emotional support, and intellectual strength to encourage growth and development in an understudy" (p. 5). Further, mentoring should be part of the ideal interaction between the graduate student and the advisor. The mentor/graduate advisor should pass his expertise he has acquired on to the mentee/graduate student, while at the same time lending moral support and providing wise career advisement (Repak, n.d.). Further dissecting the mentoring element of advising, an advisor is also considered a mentor when he or she has met expressive and socio-emotional needs (offering personal support and reliable communication). Advisors who are good mentors see the student as a whole person and know them on a personal level. In doing so, advisors can use a mix of direct teaching methods along with independent learning as they respond to their graduate student's individual needs (De Welde & Laursen, 2008).

The graduate council at UC Berkeley states the mentoring portion of the graduate student and advisor relationship should be built on commitment from the advisor. In addition, the advisor should provide the graduate student with access to "professional, collegial, and supportive guidance throughout their enrollment in the graduate program." Wrench and Punyanunt cite Hill, Bahniuk, Dobbs, & Rouner, (1989) in their 2004 article examining the interpersonal variables in the graduate student and advisor relationship. Hill et al. (1989) found that graduate advisors with positive mentoring characteristics had a huge impact on their graduate students. Further, those graduate students who were mentored reported higher levels of perceived support when compared to graduate students who were not mentored. Clark et al., (2000) found the more a graduate student felt mentored by his or her advisor, the more satisfied the graduate student was with his or her doctoral program (Wrench & Punyanunt, 2004). In the same study by Wrench and Punyanunt (2004), the authors cite the Coran-Hillix, Genshiemer, Coran Hillix, & Davidson,, (2000) study that analyzed the academic production rates of those graduate students with mentors versus those who did not have mentors. The authors found that graduate students who had strong mentor relationships with their advisor "…had more publications, more conference papers, more first-authored papers, and were more productive after graduate school when compared to those graduate students who did not have a mentor during her or his program" (p. 226).

Support and Guidance

Not only are encouragement, career advice, and mentoring key elements to the success or failure of the advising relationship; support and guidance are as well. Much like a parent, an advisor that provides high amounts of support and guidance can also offer active intervention on a needed basis. Supportive advisors also keep tabs on student progress and do not just assume a student is doing fine (De Welde & Laursen, 2008). Williams (2000) cited a study by Schaefer and Schaefer

(1993) that examined communication patterns between doctoral students and advisors in a clinical psychology program. Specifically, researchers asked students to respond to questions focused on determining what type of behaviors, by faculty, indicate a caring attitude towards the students. The researchers found one of the most common behaviors included: respecting them as a person. Graduate students "…valued casual conversations with their professors that were not necessarily academic in nature, because it showed them that their professors were interested in them as people, not just students" (p.35). Schlosser and Moskovitz (2003) stated researchers found frequent contact was likely to have allowed satisfied students to feel supported and guided by their advisors, thus creating an environment where the graduate student feels their needs are met. Frequent meetings do not guarantee a positive advisor/advisee relationship, however regular contact between the two was the norm for satisfied students in Schlosser and Moskovitz's study.

The review of literature is an important element of any study. It is important to place emphasis on all levels of literature when researching areas graduate student and advisor relationships. Researchers utilized several outlets for information pertaining to this study. To summarize, researchers utilized past research pertaining to the major characteristics found in related studies to develop the major areas of emphasis for this particular study. Repak (n.d.) states graduate students and advisors should work to create an open, non-threatening environment to cultivate potential relationships. Researchers have found complications can be prevented by starting open communication early in the relationship (Repak, n.d.). To encourage and facilitate this open communication between the advisor and graduate student, expectations should be defined early in the relationship. Graduate students should also understand the pressures that faculty face and be sensitive to the professor's limitations (Repak, n.d).

Conceptual Framework

The mentoring-empowered model (see Figure 1.1), as proposed by Selke and Wong (1993) served as the conceptual framework for this study. The mentoring-empowered model outlines potential roles advisors may play. According to Selke and Wong (1993), the five roles a successful advisor may play are: teacher, encourager, role model, counselor, and sponsor-socializer. Five factors necessary when defining the roles advisors play are located along the outer edge of the model. For an advisor to successfully serve in the roles outlined in the model, the five factors must be present between advisor and graduate students: Communication, Trust, Openness, Acceptance, and Growth.

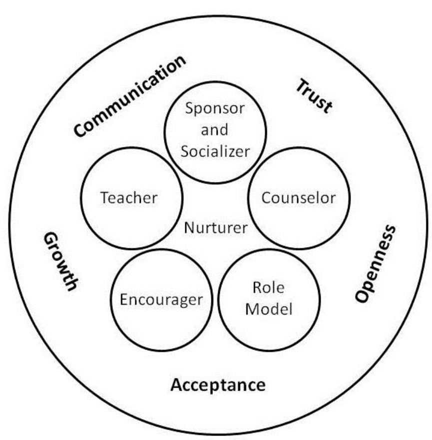

Figure 1.1. Mentoring-Empowered Model (Selke & Wong, 1993)

The mentoring-empowered model was chosen as the conceptual model for this study as it displays communication as a factor that affects the effectiveness of a graduate advisor. According to the mentoring-empowered model for an advisor to effectively serve in the various roles outlined, the factors serving as a connection between those roles need to be examined. For this particular study, the researchers focused on the communication component within the model, as it was identified as a key factor in the quality of a graduate student and advisor relationship. The mentoring-empowered model "focuses upon the psychological and developmental needs inherent to adult graduate students" (p.2) and therefore relates closely to the purpose of this study.

Purpose and Objectives

This study addressed research priority area five of the National Research Agenda: Efficient and Effective Agricultural Education Programs. Further, researchers sought to determine the following objectives:

1. To identify high-quality characteristics of a graduate advisor in agricultural education, communications, extension, and leadership.
2. To identify low-quality characteristics of a graduate advisor in agricultural education, communications, extension, and leadership.

Methods

Purposive sampling was used, in the case of this research, to seek out participants with very specific qualities: graduate students currently enrolled in a program of agricultural leadership, education, extension, or communications at either the master's or the doctoral level. While there is no hard and fast rule for determining sample size in qualitative research (Patton, 1990), it is important to note that 244 participant responses were analyzed in this study. In the case of this study, data collection used graduate students' definitions of high- and low-quality advisors, provided to the researcher as part of a larger study. These responses, by 244 graduate students, enrolled in programs of agricultural leadership, education, extension, and communications representing all regions of nation were the primary sources of data for the study.

Overall, this is a true "basic" qualitative study (Merriam, 2009). Keeping that in mind, the researchers' most important goal was to gain a detailed definition of high- and low-quality advisors. This idea is rooted in constructivist epistemology (Merriam, 2009). Data collected were unitized and categorized. Units are referred to as the "…smallest piece of information about something that can stand by itself, that is it must be interpretable in the absence of any additional information other than a broad understanding of the context in which the inquiry is carried out" (Lincoln & Guba, 1985, p. 345). The constant comparative method (Glaser and Strauss, 1967) was employed to categorize the data obtained from the interviews and the content analysis of the lesson plans. The constant comparative method allowed the researcher to repeatedly compare the responses with previous responses in an attempt to discover new relationships (Dye et al., 2000). According to Lincoln and Guba (1985), "the essential tasks of categorizing are to bring together into provisional categories [units] that apparently relate to the same content…" (p. 347). The categories of data were sorted into emergent themes. Emergent theme titles were developed distinguishing each theme from the others (Erlandson, Harris, Skipper, & Allen, 1993). Emergent themes were similar to the five factors identified through the literature review and therefore those five factors: communication competence (Ruben & Martin, 1992; Wrench & Punyanunt, 2004), encouragement (De Welde & Laursen, 2008; Williams, 2000), career advice (De Welde & Laursen, 2008; Schlosser et al., 2003), mentoring (De Welde & Laursen, 2008; Repak, n.d.), and support and guidance (De Welde & Laursen, 2008; Schlosser & Moskovitz, 2003) will serve as the categories of data in the results section. Continual revision, modification, and amendment were used until all data was classified into an appropriate theme.

In qualitative inquiry it is important to ask how researchers responded to questions of conformability, transferability, dependability, and credibility. Peer debriefing was utilized to establish credibility, consisting of an outside evaluation of the data analysis process and findings throughout the study, by individuals not directly involved in the research study. Thick description and purposive sampling was used to establish transferability. Keep in mind, purposive sampling allows the researcher to study individuals or contexts that will provide rich and pertinent detail. Dependability was established through an audit trail of codes to transcriptions and methodological journaling was used to establish both dependability and conformability.

Results and Discussion

At the onset of the study, participants were given the option of offering candid and honest answers. Keeping in mind these answers were not mandatory and the surroundings and requirements for each student vary, there were many common themes among the participants who offered answers to two open-ended questions. This group of graduate students consisted of 62.2% females with males comprising 37.8% of the population. Eighty-six percent were white, 3.9 % were Hispanic, 3.1% were African-American, and 2.8% were Asian. Nearly two-thirds (66.5%) of the respondents were between the ages of 22 and 30. Almost half (48.4%) classified themselves as Master of Science students and 19.7 % reported they were Ph.D. seeking students. The remaining 31.9% were enrolled as master of education, master of art, doctor of education or education specialist. A majority (65.7%) described themselves as on-campus students, while 34.3% reported being distance education students. Similarly, 61.8% were classified as full-time students and 38.2% classified themselves as part-time students. Nearly a third (29.9%) reported their focus area to be teacher education, followed by 25.2% reporting Extension Education as their focus. Agricultural Leadership accounted for 15.7% of the respondents and Agricultural Communications majors made up 9.8% of those who responded.

The graduate students in the study were also asked to provide demographic information on their advisors. Approximately one-fourth (27.8%) reported having a female advisor, with 72.2% having a male advisor. The final demographic characteristic reported by graduate students was their advisor's professorial level. Only 21.4% stated their advisor was an assistant professor, 38.1% of the graduate student's advisors were associate professors, and 40.5% of the graduate advisors were at the professor level.

A few of the emergent themes among the responses included: time spent in office, timeliness in returning phone calls and replying to emails as well as having an advisor who is encouraging and friendly. Many graduate students also noted having an advisor who was well respected in their field among other positive qualities. Following a thorough analysis of the data it was apparent that the emergent themes resulting from the data were very similar to the five factors identified in the graduate student/advisor literature: communication competence (Ruben & Martin, 1992;

Wrench & Punyanunt, 2004), encouragement (De Welde & Laursen, 2008; Williams, 2000), career advice (De Welde & Laursen, 2008; Schlosser et al., 2003), mentoring (De Welde & Laursen, 2008; Repak, n.d.), and support and guidance (De Welde & Laursen, 2008; Schlosser & Moskovitz, 2003). Therefore, the data was categorized according to the five factors identified in the literature review.

Results of Question 1: What are the Characteristics of a High-quality Advisor?
According to the graduate students who participated in the study, high-quality advisors should possess a variety of characteristics. Below is description of characteristics as they fall into the categories described in the review of literature.

Communication competence. Specifically discussing the communication competence characteristics, the following emergent themes were present: “active listeners,” “always be available to answer questions,” and “be approachable.” However, not only should advisors be available, graduate students prefer promptness in returning phone calls or emails. Case and point, students stated, a high-quality advisor should “get back to your emails and phone calls in a timely fashion,” and provide “prompt answers to questions” from graduate students.

Encouragement. When it comes to advisor encouragement and the preferences of graduate students, the common premises and high qualities among the students included advisors who are, “helpful in achieving student goals,” an advisor that is “advocate for student success,” and an one that is willing to “be the cheerleader” for the graduate student. Other emerging themes specifically describing encouragement among advisors included, “availability, support, empathy” towards the graduate student.

Career advice. Specifically discussing career advice from the advisor, this graduate student had this to say, an advisor should “provide additional opportunities for research/teaching/presenting/etc.” while the student is enrolled in graduate school. Another graduate student stated a high-quality advisor should also be one who “wants to help students succeed, provide experiences to the students” as well as possess a “sincere desire to help me achieve my goals.” Further, to aid the graduate student in a future career, a high-quality advisor should be one who offers “ongoing quality research opportunities for student to be engaged in” and “provides opportunity to advance in my field of study.”

Mentoring. When specifically discussing the mentoring area of a high-quality advisor, a positive characteristic of an advisor is someone who provides “good informative feedback on progress of strengths and weaknesses.” Also according to the graduate students who participated in the study, advisors should also be “motivated, helpful, and offer constructive criticism” to their graduate student. They should encourage “professional development,” “express interest and help the student pursue research in his/her field,” and be “patient, and have a willingness to help”

Support and guidance. Exclusively discussing the various styles of support and guidance stated by the students, high-quality characteristics of advisors included these statements concerning their advisors: “are willing to listen to what it is you want to get out of the program and can direct you in reaching goals.” As well, high-quality advisors also included having an “open door policy” and “an open personality that allows for positive interactions.” Further, one student also stated advisors should “make time” for their graduate students by scheduling “time for one-on-one meetings,” as well as “providing guidance and feedback as often as needed.” Further, an advisor should “prepare the student for the final graduation requirements (Dissertation, Defense, oral & written examinations, etc...)”

Results of Question 2: What are the Characteristics of a Low-quality Advisor?
Similar to question 1, emergent themes are reported as they relate to the literature review. Below is description of characteristics.

Communication competence. In discussing communication competence, students stated a low-quality advisor would be one who “is not in their office and available during norm department hours and ignores phone calls and messages.” In addition, a low-quality advisor would also be one who is “disconnected,” “never available,” or a “poor communicator.”

Encouragement. Particularly discussing encouragement and how it relates to a low-quality advisor, students described a low-quality advisor this way: “not willing to help,” “does not want to help students get ahead” and, “doesn't allow you to spend enough time on your own research and professional pursuits.” Moreover, a low-quality advisor “does not care about student involvement in research projects,” and is “rude, doesn't make time for you, and is neglective”.

Career advice. Career advice relates to a low-quality advisor in a variety of ways. For instance, students stated a low-quality advisor is one who “won't let students make decisions about the degree plan,” “doesn't encourage pursuits beyond coursework,” and “doesn't care about the future of the student (whether they fail/succeed).” In addition, students also stated, a low-quality advisor is “not caring much about professional conferences that his student needs to attend” and “doesn't care about the future of the student.”

Mentoring. Concerning mentoring characteristics of a low-quality advisor, students expressed a low-quality advisor is one who “treats you like you are less than them because you do not hold the degree or job title” or is “standoff-ish, unreliable in regards to appointments and scheduling, and never offering his or her opinion on direction.” One student also stated a low-quality advisor is one who “doesn't care about student progress,” “provides little or no information,” “shows a lack of interest in students,” and lastly is “not willing to help student solve problems”

Support and guidance. Regarding support and guidance, students described a low-quality advisor as, “An unengaged person who doesn't care about the whole student (academic and personal goals),” one who shows “no guidance,” is “not helpful and often unavailable,” and “allows the student to choose their own path without any guidance.” Further, students also stated a low-quality advisor “doesn't care about students,” is “unwilling to assist your needs,” and shows “no willingness to meet or help.”

Conclusions/Recommendations/Implications

Overall, graduate students seem to appreciate communicating with their advisors frequently and through face to face meetings or email. Even though there are numerous means of communication methods available to graduate students, many graduate students prefer face to face communication with their advisors and appreciate a quick and prompt return of a phone call or email. Graduate students also define a high-quality advisor as one who is encouraging and follows the academic progress of the student closely. Because face to face communication and email are frequently stated as a preferred means of communication with between graduate students and their advisors, graduate students in this study do not strongly follow the trend of the millennial generation and still prefer more conventional and personal means of communicating with their advisor.

Graduate students expect their advisors will be readily available to assist them whenever they need assistance. According to the results of study, a majority of the graduate advisors are available to the graduate students when questions arise and they are flexible and willing to meet with graduate students at their convenience, even if the most convenient time is before or after regular business hours.

The results of this study imply graduate advisors within agricultural leadership, education, extension, and communications are offering several different forms of a graduate program experience. Many advisors within the profession not only possess the desired communication skills, as outlined by the graduate students, but they also display a few of the other factors described by the mentoring-empowered model. By displaying other factors outlined in the mentoring-empowered model, advisors within agricultural leadership, education, extension, and communications possess the characteristics needed to better fulfill the multiple roles of an advisor in accordance with Selke and Wong's (1993) model.

Further studies should be conducted to determine if there is a difference between the ranks of professors and the frequency and means of communication. A qualitative study, involving interviews with graduate students about this topic, should be conducted to add a richer description to the social interactions between the graduate students and their advisors. Additionally, studies should be conducted outside of the agricultural education profession and the results of the studies should be compared to determine if the advisors within agricultural education are communicating as often as, or more often than their counterparts in other departments. One graduate student summarized a high-quality advisor as "kind, caring, and willing to help" and "treats students like a colleague, respects research ideas and interests, and offers verbal encouragement as well as being supportive".

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Agricultural Education Teachers' Use of Instructional Plans and Planning

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Agricultural Education Teachers' Use of Instructional Plans and Planning

This study examined the instructional planning practices of early career agriculture teachers participating in the 2011 National Association for Agricultural Education Teachers Turn the Key program. Data were collected using a survey instrument to examine teachers' planning practices, planning requirements, use of lesson plan models, and use of professional curriculum materials. The study found a large variation in teachers' planning practices, use of lesson plan models and professional curriculum resources, and time dedicated to instructional planning. Additionally, teachers in this study reported a much lower amount of time planning for instruction than previously reported in other studies. Overall, researchers suggest the inclusion of a variety instructional planning formats in teacher preparation coursework. It is suggested further research be conducted on a larger scale to explore instructional planning trends and processes that teachers use when planning lessons.

Introduction/Conceptual Framework

Instructional planning is often argued to be one of the most important professional activities for teachers (Young, Reiser, & Dick, 1998). With an increased emphasis on highly qualified and effective teachers, states are grappling with best approach to measure and maintain quality teaching (Little, Goe, & Bell, 2009). In North Carolina for example, an evaluation system has been implemented requiring teachers to provide documentation as evidence they are meeting specific standards. As a part of this system, lesson plans serve as artifacts indicating teachers are knowledgeable about their content and are able to facilitate student learning (Public Schools of North Carolina, 2009). Historically, instructional planning has been a cornerstone in teacher preparation coursework. However, the expansion of standardized teacher evaluation systems, such as the one found in North Carolina has led to renewed interest about the current instructional planning practices of teachers.

Clark and Dunn (1991) described the knowledge of teacher planning as a contributor to the greater understanding of teaching in general. According to the National Comprehensive Center for Teacher Quality (Little et al., 2009), lesson plans are one of the primary artifacts often used to allow teachers to convey quality of the instruction within their classroom. During the development of an instructional plan, teachers make a variety of decisions (Clark & Peterson, 1986). In addition to determining objectives and content, teachers are charged with evaluating and selecting from a plethora of lesson plan formats and templates. Greiman and Bedtke (2008) reported a wide variety of instructional planning models taught to preservice teachers in 31 agricultural education departments, including 11 different lesson plan formats.

While instructional planning is often a core component of teacher preparation programs, there is research suggesting many teachers fail to plan or if they do plan, they rarely use systematic planning models (Clark & Dunn, 1991; Driscoll, Klein, & Sherman, 1994; Kennedy, 1994). A qualitative study conducted by Reiser (1994) found preservice teachers were excited about implementing planning strategies learned in their teacher training programs, however they failed to employ recommended practices when they began student teaching. Similar studies have found most teachers do not use elaborate lesson plans but instead use short or brief plans containing relatively little detail (Briggs, 1977; Kagan & Tippins, 1992; Merrill, 1971; Reiser, 1994; Reiser & Mory, 1991).

There has been limited research examining the phenomenon of instructional planning specific to agricultural education. In 2005, Ball and Knobloch analyzed the course readings, assignments, and teaching methods included in undergraduate teaching methods courses offered by agricultural education departments around the country. From the 40 syllabi analyzed in the study, it was concluded that 90% ($n = 36$) of the teaching methods courses required the submission of lesson plans. Additionally, a qualitative study of beginning agriculture teachers discussed three primary themes guiding the planning process (Ball, Knobloch, & Hoop, 2007). The first theme described the mental processes used by the participants in which they tacitly identified the purpose of the lesson instead of creating a written plan. The second and third themes discussed the participants' approach to prioritizing key content and utilization of a daily or hourly approach to planning. The themes identified through this model also found formalized lesson plans were rarely used and were sometimes even deemed a "waste of time" (Ball et al., 2007, p. 68).

Clark and Peterson (1986) developed a model illustrating the reciprocal relationship between teachers' thought processes and observable teaching behaviors. According to this model, the planning process includes pre-instruction and post-instruction, teachers' interactive thinking while teaching, and teachers' beliefs. The observable teaching behaviors encompass the actions of both teachers and students in the classroom as well as student achievement. In a later examination of research related to instructional planning, Clark and Dunn (1991) described a conceptual framework composed of two distinct approaches. One approach is informed by educational theories and psychology. The second approach focuses on the essence of teacher planning and "the things that teachers do when they say they are planning" (Clark & Dunn, 1991, p. 185).

Current practice in educational planning utilizes two main planning models: linear and cyclical. Linear planning models are characterized by a planning process progressing directly from desired outcomes. In this model, objectives are first identified and then lesson components are created to support the stated goals. One of the most popular linear models for lesson planning and curriculum development is the rational or objective first model developed by Ralph Tyler (1949). The Tyler model consists of four main steps: identifying educational objectives, identifying learning experiences, organizing those experiences in a logical and effective sequence, and evaluating the educational attainment of the objectives. This model has often been used as the basis for later models including the Madeline Hunter model of lesson planning. The Hunter (1984) model is based upon seven linear planning steps including establishing focus through the use of an anticipatory set, articulating objectives and purpose, providing instructional input, modeling, monitoring and adjusting instruction, facilitating guided practice, and providing independent practice.

Yinger (1980) described a more cyclical model of instructional planning that incorporates three stages of instructional planning. The first stage identifies a problem for continued examination. The second stage allows for the generation of potential solutions followed by a third stage of implementation and evaluation. Additionally, other research suggests teachers often focus on learning activities provided by the students and then move to the objectives developed through the lesson and activities (Eisner, 1967; MacDonald, 1965).

This study is an attempt to better understand how teachers plan for instruction. This increased knowledge of current instructional planning practices as well as the planning expectations of school systems will inform teacher preparation programs as they train preservice teachers to be successful in developing suitable and useful instructional plans. This study is also tied to the Priority Area Four of the National Research Agenda by providing meaningful, engaged learners in all environments by identifying the planning styles of current teachers.

Purpose/Objectives

The purpose of this study was to examine the planning practices used by early career teachers in agricultural education. Specifically, this study looked at the planning practices of the 2011 National Association of Agricultural Educators (NAAE) Teachers Turn the Key (TTTK) Participants. This study addressed the following objectives:

1. To determine the personal characteristics and course preparations of 2011 Teachers Turn the Key participants.

2. To identify the planning practices of 2011 Teachers Turn the Key participants.

3. To identify specific planning requirements and lesson plan models being used by used by 2011 Teachers Turn the Key participants.

4. To identify the use of professional curriculum materials by 2011 Teachers Turn the Key participants when planning for instruction.

Methods/Procedures

This descriptive census study used a survey instrument to gather data from a target population consisting of the 2011 NAAE TTTK participants. The NAAE TTTK program recognizes outstanding second, third, and fourth year agriculture teachers. In order to qualify for this program, early career teachers must be NAAE members and be selected to participate by their state association (National Association of Agricultural Educators, 2011). The 2011 program was made up of 32 agricultural education teachers, representing 28 different state associations.

The survey instrument used in this study was adapted from earlier instruments and prior research conducted by Brown (1988), Greiman and Bedtke (2008), Sánchez and Valcárcel (1999), Searcy and Maroney (1996), and Young et al. (1998). The survey consisted of two main parts. The first part of the instrument consisted of 15 questions related to instructional planning and the second part of the instrument was made up of seven demographic questions including grade level taught, years taught, certification, degrees completed, gender, and NAAE region. Face and content validity was assessed using a panel of experts composed of high school teachers and agricultural education university faculty. A pilot study was conducted with 15 early career teachers and student teachers from three different agricultural education programs.

Changes were made based on responses to the pilot study and participant feedback. Revisions to the survey instrument consisted of modifying lesson plan models used and editing questions determined to be irrelevant for the current study. Data were collected from TTTK recipients by administering a paper survey instrument asking for identification of specific planning strategies. Of the 32 participants attending the NAAE conference, each participant completed the survey instrument for a 100% response rate. It should be noted this study focuses on a small group of agricultural education professionals and results are therefore limited to this population and are not necessarily generalizable to agricultural education teachers as a whole.

Results/Findings

Personal Characteristics and Course Preparations of Participants

Of the 32 respondents, 34.4% were male and 65.6% were female. Nine respondents (28.1%) had completed their bachelor's degree, eight respondents (25.0%) were taking classes for a master's degree, and 11 (34.4%) had completed their master's degree. Four respondents indicated they were pursuing a different type of degree with three taking classes for specialist and master's plus degrees and one participant taking classes to complete their bachelor's degree. Thirty participants were traditionally certified with one alternatively certified participant and one participant transitionally certified and working toward traditional certification. Participants were representative of all six NAAE regions. There were four participants (12.5%) each from Region One and Region Two, six participants (18.8%) from Region Three, five participants (15.6%) each from Regions Four and Five, and eight participants (25.0%) from Region Six. Close to one-third (37.5%) of the participants had taught for four years with the average being 4.03 years. Two participants had taught for two years and one participant indicated they had taught for six years. Nineteen (59.4%) of the TTTK participants indicated they taught high school classes, two indicated they only taught middle school classes and five (31.3%) indicated they taught both middle school and high school classes as part of their program. One participant taught in a specialized junior high school program for 8th and 9th graders. Participants taught a wide variety of courses with an average of five different classes to prepare for each academic school year.

Planning Practices of the 2011 Teachers Turn the Key Participants

In regards to instructional planning, Table 1 displays the many different types of instructional plans participants used on a regular basis. The majority of participants (62.5%) wrote weekly lesson plans. Sixteen respondents (50.0%) indicated they completed unit plans. Twelve respondents (37.5%) specified they used daily lesson plans and whole course plans or outlines. One respondent listed a "semester at a glance" plan as an additional type of instructional planning practice.

Table 1
Types of Lesson Plans Completed by Study Participants (N = 32)

	f	%
Weekly Lesson Plans	20	62.5
Unit Plans	16	50.0
Daily Lesson Plans	12	37.5
Whole Course	12	37.5
Other Responses	1	3.1

When asked how many hours participants spent each week planning for instruction, 50% of respondents (N = 16) indicated they spent one to five hours planning coursework. Eleven respondents (34.4%) spent six to ten hours planning instruction each week while three respondents (9.4%) spent 11 - 15 hours planning and only two respondents indicated they spent 16 - 20 hours planning.

To better understand how participants were creating lesson plans, respondents were asked to identify which order they planned lesson components. Table 2 lists the components the participants reported planning first. In general, the first area usually planned by TTTK teachers was the objectives, followed by content, strategies, activities, and then assessment.

Table 2
Lesson Plan Components Indicated As Being Planned First By Respondents (N = 32)

	f	%
Objectives	15	46.9
Content	14	43.8
Strategies	2	6.3
Assessment	1	3.1
Activities	0	0.0

Planning Requirements and Use of Lesson Plan Models in Instructional Planning

Participants were asked if their school systems required them to use a specific lesson plan model or if they could select their own planning model. Additionally, participants indicated the model used for lesson planning. Table 3 lists the various models either required by school districts or selected by individual participants.

Table 3
Use of School Required and Personal Instructional Planning Models (N = 32)

	School Required Lesson Plan Template	%	Personal Lesson Plan Template	%
I am unsure on which model my lesson plans are based	9	78.6	13	59.0
Learning Focused Schools	2	14.3	1	4.5
Other	1	7.1	5	23.0
Classroom Instruction that Works (Marzano)	0	0.0	1	4.5
Tyler Objectives-First Model	0	0.0	1	4.5
Understanding by Design (Backwards Design)	0	0.0	1	4.5
Gagne's Events of Instruction	0	0.0	0	0.0
Madeline Hunter Direct Instruction Model	0	0.0	0	0.0
Yinger's Process Model	0	0.0	0	0.0
5 E's	0	0.0	0	0.0
Other Responses	-unit/objective/ purpose/standard		-self created -go with what works -outline of units linked to framework -fill out lesson plan book with pages used and assignment -Understanding by Design and Classroom Instruction that Works (Marzano)	

*two respondents indicated that they used both a personal and a school required lesson plan

Nineteen of the respondents (59.3%) reported their school or district did not have a required lesson plan format teachers were required to use while only seven (21.9%) were required to use a specific lesson plan by their school system. The remaining six respondents (18.8%) had lesson plans formats that were recommended but not required.

Of the participants using a lesson plan format required by their school system, 78.6% were unsure of the educational model their lesson plans were actually based on while 14.3% (f = 2) indicated their school system required the Learning Focused Schools template. Thirteen respondents were unsure which lesson plan model their personal lesson plans were based on. The Tyler Objective-First Model, Understanding by Design (Backwards Design), Classroom Instruction that Works, and Learning Focused Schools were each used personally by one respondent. Five respondents were unsure which model their personal lesson plans were based on, though most described a self-created model or a mixture of models.

Table 4 displays the instructional components participants included in their lesson plans. There were no components included by all of the respondents, instead a wide variety of areas were indicated as being part of their instructional plans.

Table 4
Instructional Components Included in TTTK Participants' Lesson Plans (N = 32)

	f	%
Title of course, unit and/or lesson	28	87.5
Instructional objectives	26	81.3
Teaching materials/resources/supplies	25	78.1
Content material/Subject matter	22	68.8
Evaluation	20	62.5
Interest Approach/Anticipatory Set	17	53.1
Summary/Closure	14	43.8
Standards: National, State, Local, Academic	14	43.8
Key Terms/Academic Language	14	43.8
Application	12	37.5
Estimated time required	12	37.5
Checks for Understanding	10	31.3
Instructional Strategy/Teaching Methods	8	25.0
References	7	21.9

Purpose or Broad Goal	7	21.9
Teacher Reflection	3	9.4
Modifications for Special Needs Students	3	9.4
Situation	2	6.3
Modifications for English Language Learners	1	3.1
Other Responses	0	0.0

Table 5 displays the frequency of which participants were required to submit lesson plans to school administration. Seventeen respondents (53.1%) indicated they were required to submit lesson plans. Of those required to submit plans, 47.0% were required to submit plans on a weekly basis.

Table 5
Frequency of Lesson Plan Submission to Administration (N = 32)

	f	%
Weekly	8	47.0
Other	5	29.4
Each Semester	2	11.8
Monthly	1	5.9
Quarterly	1	5.9

Other Responses:
- -Weekly/trimester semester/year
- -When I remember to
- -Teachers preference
- -Each semester or by unit
- -Three times per year for formal observations

Use of Professional Curriculum Materials When Planning

Table 6 shows how often respondents used professional materials when preparing instructional plans. A majority of participants indicated using NAAE Communities of Practice (*f* = 20, 62.5%). Other web-based resources often used included the Georgia Agricultural Education site (*f* = 17, 53.1%) and Glen Rose FFA (*f* = 13, 40.6%). Respondents also reported using state curriculum (*f* = 16, 50.0%), Agriculture in the Classroom (*f* = 13, 40.6%), Center for Agricultural and Environmental Research Training (CAERT) (*f* = 11, 34.4%), Curriculum for

Agricultural Science Education (CASE) (f = 5, 15.6%), LifeKnowledge (f = 5, 15.6%), and textbooks (f = 11, 34.4%) as part of their planning practices.

Table 6
Use of Professional Curriculum Materials When Planning (N = 32)

	f	%
NAAE Communities of Practice	20	62.5
Georgia Agricultural Education Site	17	53.1
State-developed curriculum	16	50.0
Agriculture in the Classroom	13	40.6
Glen Rose FFA Site	13	40.6
Center for Agricultural and Environmental Research Training (CAERT)	11	34.4
Textbook specific	11	34.4
Other	9	28.1
Curriculum for Agricultural Science Education (CASE)	5	15.6
LifeKnowledge Curriculum	5	15.6

When asked how often teachers used these materials when preparing for instruction, 22 of the participants (68.8%) used them *frequently*, seven respondents (21.9%) used them *very frequently* and three respondents (9.4%) used them *sometimes*, none of the respondents indicated using professional materials *rarely* or *not at all*.

Conclusions/Recommendations/Implications

On average, the TTTK participants were primarily female and had a Master's degree. All but two of the participants were traditionally certified. While participants represented all of the NAAE regions, there were slightly more participants from Region Six. Participants were primarily high school teachers. The 2011 TTTK participants had been teaching for an average of 4.03 years. Since this program primarily focuses on teachers who are in their second, third, and fourth year teaching, these demographics are consistent with the stated purpose and goals. Surprisingly, these participants reported an average of five class preps in an academic year. While there has been little research in agricultural education on what constitutes an average teaching load, the number of classes taught by each respondent varied greatly from one prep to nine preps. This may contribute to the wide variation in the amount of planning time per participant. Patterson (2005) stated the ideal teaching load for new teachers is approximately two preps. Yet, it is thought the average number of classes a new teacher might be asked to teach is significantly higher than this recommendation (Patterson, 2005).

There were a wide variety of instructional plans the participants reported using on a regular basis. The most common types of lesson plans completed by teachers were weekly lesson plans, while 50% of the respondents indicated they used unit plans as part of their planning practices. Only 12 participants indicated using daily lesson plans. This finding is similar to a study conducted by Yinger (1980), indicating traditional universities may overestimate the value of daily lesson plans when instead, weekly lesson plans allow teachers to develop activities that are part of weekly or yearly activities. The use of weekly lesson plans allows planning to be more cyclic and based on classroom routine (Doyle & Holm, 1998).

Contrary to previous studies, 50% of teachers indicated they only spent one to five hours per week planning for instruction. In a study by Murray, Flowers, Croom, and Wilson (2011), agriculture teachers reported spending an average of nine hours a week on classroom preparation. It is unclear what may contribute to this decrease in time dedicated to planning. Half of the teachers within this current study indicated they spent a relatively small percentage of their time planning despite the wide variety of classes being taught. This should be explored further to determine how teachers utilize the time they dedicate to instructional planning.

Participants were also asked to identify how they plan their lessons. In most teacher education programs, it is common to require students to begin their lesson planning with the specification of instructional objectives (Kagan & Tippins, 1992), however there was not consensus among this group of respondents as to the area they plan first. Only 46.9% of the respondents indicated planning their objectives first indicating that many teachers within this study followed the more non-liner instructional planning model. The planning model most reported by participants was to first plan objectives, followed by content, strategies, educational activities, and lastly the assessment. It was also commonly reported these respondents began their plan by considering content first, then moving onto other parts of the lesson. Doyle and Holm (1998) suggested the use of a non-traditional non-linear planning model allows teachers to better anticipate learners' reactions and responses using a more flexible approach with just a general idea for a learning activity. Despite this, more historical research suggests traditional planning models are still the most common form of planning taught in preservice programs (Cochran-Smith, 1994). In a more recent study conducted by Greiman and Bedtke (2008), the two most common lesson plans required by 20 agricultural education teacher preparation programs were the Allen 4-step method and the Madeline Hunter Direct Instructional Model, which are both heavily focused on linear planning.

Over half of the participants had the ability to select their own lesson plan template. Seven participants were required to use a template by their school system, however only two were able to identify the specific template. Of the participants who had autonomy in lesson planning, most were unable to identify a specific lesson plan model used or reported using a self-created model or mixture of models. Considerable variation existed in the components included in participants' lesson plans. In at least half of the participants' lesson plans, they included the title of the course, unit, and/or lesson, instructional objectives, teaching materials/ resources/ supplies, content material/subject matter, evaluation, and interest approach/anticipatory set. These findings are similar to the instructional plan components utilized in agricultural education as reported by Greiman and Bedtke (2008). The components included least frequently consisted of modifications for English Language Learners, situation, modifications for special needs students, and teacher reflection. Approximately half of the participants were required to submit lesson plans to administration. The frequency of submission varied from *weekly* to “when I remember to” with *weekly* being the most common.

Participants reported using a variety of professional curriculum materials to support their development of lesson plans. The most commonly used resource was the NAAE Communities of Practice, followed by the Georgia Agricultural Education site and Glen Rose FFA site. The least commonly utilized curriculum materials included the Curriculum for Agricultural Science Education (CASE) and LifeKnowledge. Teacher education programs and teacher in-service programs should continue to provide teachers with opportunities to explore new professional materials and provide access to teaching resources that can enhance instructional practices.

This study showed a large variance in planning practices of the participants. There was very little consensus on types of models used, planning practices, and even time dedicated to planning. With such a wide variety of models and methods used by teachers and required by school districts, teacher educators should consider evaluating their approach to instructional planning included in their teacher preparation courses. Given the results of this research, it seems appropriate to present several different instructional planning templates instead of focusing on one specific template. This will allow preservice teachers to utilize a template they find most appropriate or may be required by their school system. For new teachers in particular, presenting multiple lesson plan templates and allowing them to experience both linear and cyclical lesson planning may allow teachers to develop lesson planning strategies that better support their teaching style. Providing additional planning resources may in turn, help to prevent student teachers from abandoning planning as indicated by Reiser (1994).

This study specifically examined instructional planning limited to a written instructional plan. The literature also notes the importance of teachers’ knowledge and the transfer of prior instructional planning into observable teaching behaviors. Additionally, research should inquire as to how teachers mentally plan for classroom instruction. Interviews could be conducted with teachers allowing them to explain the instructional considerations they make that may not be evident on a written instructional plan. Also, observations of classroom instruction could examine how instructional plans transfer to teaching practices.

As previously mentioned, this study focuses on a small subgroup of agricultural education teachers. Participants in the Teachers Turn the Key program are a small group of novice teachers and the generalizability of these findings is limited to this group. However, with the current lack of research related to instructional planning, these findings may provide insight as to current trends within the field and education in general. This study also provides an important foundation for future inquiry. Similar studies should be conducted on a regular basis to allow teacher educators to keep current with instructional planning formats required by school districts or commonly utilized by individual teachers. With the focus of the current study on early career teachers, there are additional opportunities for research on the planning practices of mid-career and veteran agriculture teachers.

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Educators' Perceptions of Job-Related Competencies Needed by Entry-Level International Development Agents

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Abstract

According to the United States General Accounting Office (2003), since 1992 the United States Agency for International Development (USAID) staff has decreased substantially. As a result, USAID increased its reliance on contractor staff to manage its day-to-day overseas activities. This shift in staffing has pushed many non-governmental agencies (NGOs) to become involved in implementing aid-supported development. Historically, (USAID) and the United States Department of Agriculture, Foreign Agricultural Service (USDA, FAS) have looked to American universities as its source for preparing future consultants. More specifically, they have looked to land-grant universities and Extension (Duffy, Toness, & Christiansen, 1998; Finley & Price, 1994). Recent college graduates with an interest in international agriculture and extension education fill these expanding job opportunities. Colleges and universities are charged with effectively designing curricula that enable students to acquire the needed competencies and better prepare individuals to live and work successfully in other cultures (Irigoin, M., Whitacre, P., Faulkner, D., & Coe, G., 2002).

The purpose of this study was to describe educators (AIAEE members) perceptions of job-related competencies for entry-level international development agents. Nine constructs were garnered from the research: conflict management and resolution, cultural diversity, management responsibility, personal and professional development, personal skills, program planning and evaluation, public relations, staff relations, and work habits. An online questionnaire was used to collect data and 88 responded, however, 28 were eliminated from the study because of no academic affiliation of incomplete. Educators rated all nine constructs as somewhat important or important. When asked to rank the constructs in order of importance, participants ranked program planning and evaluation as the most important followed by cultural diversity, and work habits.

Type of research: (Quantitative) RPA: (Extension Education)

Educators' Perceptions of Job-Related Competencies Needed by Entry-Level International Development Agents

Introduction

World issues are becoming an important element at all levels of education – and especially in agriculture and rural development (Beavers, 1985; Jackson & Boateng, 2006; Toness, 2001). Young people must be globally minded to succeed in the job market and they need to be prepared to work throughout the world. According to the United States General Accounting Office (2003), since 1992 United States Agency for International Development (USAID) staff size has *decreased* by 37 percent, while USAID's funding has *increased* by 57 percent. In order to cope with this discrepancy, USAID has increased its reliance on contractor staff to manage its day-to-day activities in many overseas locations. This shift has resulted in many non-governmental agencies (NGOs) becoming involved in implementing aid-supported development.

Historically, (USAID) and the United States Department of Agriculture, Foreign Agricultural Service (USDA, FAS) have looked to American universities as its source for preparing future employees and more recently future consultants. More specifically, they have looked to land-grant universities and Extension (Duffy, Toness, & Christiansen, 1998; Finley & Price, 1994) to provide the human capital for many international development projects. Both agencies observe similarities between the role of international development agents and Cooperative Extension Service Extension Educators. Because the amount of financial and human resources being invested in international development has increased so dramatically, it is important to understand the competencies needed by agents working in international development.

One of the responsibilities colleges and universities have is to effectively design educational programs that will enable students to acquire the needed competencies and to better prepare individuals to live and work successfully in other cultures (Irigoin, M., Whitacre, P., Faulkner, D., & Coe, G., 2002; Vulpe, Kealey, Protheroe, & Macdonald, 2001). According to the United States Department of Education's National Center for Educational Statistics (2007), if students are better prepared for the positions they seek, greater job satisfaction and advancement will follow.

Miller (2004) posits that agencies that hire recent college graduates often have a focus different from that of preparatory educational institutions. Are institutions teaching the needed competencies for development? That is unclear. Cooper and Graham (2001) identified seven competency constructs for Extension faculty working in the United States, which included 1) program planning, implementation, and evaluation; 2) public relations; 3) personal and professional development; 4) staff relations; 5) personal skills; 6) management responsibility; and 7) work habits. Those researchers concluded Extension Agents who encompassed those seven competency areas were better prepared to meet the needs of the clientele and possibly more effective in their jobs.

Theoretical Framework

The theoretical framework for this study was grounded in the human capital theory. The theory specifies as people expand their knowledge through formal education or training programs, so does their capacity to be successful (Becker, 1993). Students come to universities to acquire the knowledge and skills necessary to be competitive in the job market. Education embraces the human capital theory; schooling enhances students in economic and socially productive ways (Reed and Wolniak, 2005). According to those researchers; theorists may question if people truly get ahead through education, but few principles are more accepted in American culture than the relationship between education and economic advancement of employees or companies by way of human capital (Reed and Wolniak, 2005). It is important therefore, for educational institutions to know what is needed in the job market in order to effectively prepare students for careers after graduation (Becker, 1993; Quiggin, 2000 and, Shultz, 1961).

Human capital fosters the idea that success is directly correlated to education, the more education or training that is received the probability to be successful increases. Providing educational courses that align with the needs of the industry enhances the preparedness of the employee. It gives the future employees a competitive advantage in the job market and provides employers with competent and capable employees to perform the work without much need for additional training before being sent to the field.

Schultz (1961) points out that education is linked to the productivity and adaptability of employees. Therefore, human capital was defined as competencies needed by college graduates who aspire to work as international consultants and/or agents of development in international settings, and knowledge of those competencies for college or university faculty who teach courses in development. One could conclude, as better prepared college graduates enter the international development sector, they and their employers would benefit. Accordingly, it is posited that describing the perceptions of faculty charged with providing relevant coursework would better inform future decisions about course offerings and structured learning experiences. Reed and Wolniak (2005) suggested that by making schooling responsible for economic or physical productivity employees bring to the labor market, human capital theory encompasses investment in education, labor market potential of students, and the process of classroom learning. This assumption thrusts the theory directly in the center of the education process.

Purpose and Objectives

The purpose of this study was to describe the competencies needed for entry-level international agents. Specifically, this study investigated job-related competencies as perceived by university faculty who are members of an international agriculture and Extension education association (AIAEE). Two objectives were developed.

1. To describe the perceptions of academic members of the Association for International Agricultural and Extension Education (AIAEE) who prepare students for careers in international development regarding the importance of selected job-related competencies.
2. To describe the relationship of age and years of work experience in a foreign country with the ranking of the nine constructs.

Population

The population for this study was the membership of the 2009-10 membership of the Association of International Agriculture and Extension Education (AIAEE) organization. Membership in AIAEE consisted of 178 faculty, emeriti faculty, graduate students and NGO/Governmental employees. Individual membership affiliation was unknown to the researchers at the beginning of the study and only determined later when members self-identified that they held an academic appointment. Of the AIAEE members who participated in the study, all members except for those identified as employees of government agencies or employees of NGOs were included in the study. The researcher deemed that as those two subgroups, who did not hold academic appointments, had limited impact on educator's perceptions of needed competencies. Data was collected during the months of December 2009 and January 2010. To ensure a high participation rate, Dillman's (2000) five-step survey method was implemented.

Eighty-eight AIAEE members responded to the questionnaire and who participated in the study. Of those 88, 16 identified themselves as employees of NGOs and 12 instruments were completed incompletely and discarded. Sixty completed instruments were included in this study. Therefore, the researchers cannot generalize to all AIAEE members, but only to those respondents. The issue of non-response could not be addressed due to the design of this study. The researchers could not know the affiliation of the non-respondents and how many of the remaining population was NGO/governmental employees who would have been disregarding from the study.

To address the international logistics of some participants, an electronic questionnaire was designed and implemented. Creswell (2005) stated, "With the increased use of the websites and the Internet, electronic questionnaires are becoming popular" (p. 361). Web-based surveys have yielded a higher response, cost less, and are returned more rapidly than postal mail surveys (Griffis, Goldsby & Cooper, 2003). However research conducted by Shih, and Fan (2008) indicated that response rates were at times lower than paper surveys. The instrument used in this study contained a self-coding mechanism that allowed the researchers to group the responses.

Methods/Procedures

The methodology used in this study was a criterion group survey research design. To achieve the research objectives, the researcher modified a preexisting Internet-based instrument designed by Cooper and Graham (2001) which used a five point, summated scale on competencies needed by Extension educators in the United States Department of Agriculture Cooperative Extension Service. Descriptive and correlation statistics were used to determine the importance of competencies needed for success.

In addition to the constructs identified by Cooper and Graham, Two additional constructs were deemed important conflict management/resolution and cultural diversity. Ilvento (1996), Langone (1992), and Moore and Rudd (2004) suggested that working with people in areas of community or agricultural development invited conflict. Mauro and Hardison (2002), and the United Nations (2005) suggested cultural diversity enables people to look for different ways to address community and company needs (see Table 1).

Table 1
Comparison of Competency Constructs

Cooper and Graham (2001) Constructs	Revised Instrument Constructs
Program planning	Program planning and evaluation
Public relations	Public relations
Personal and professional development	Personal and professional development
Faculty and staff relations	Staff relations
Personal skills	Personal skills
Management responsibility	Management responsibility
Work habits	Work habits
	Cultural diversity
	Conflict management and resolution

The construct validity of the instrument was determined by logical analysis during the pilot test; answers from the pilot were compared for differences. The answers followed the theoretical ideas of the researcher, thus allowing this researcher to conclude the pilot group perceived the instrument in a similar manner. According to Wiersma and Jurs (1990), comparing the scores for differences to see if the research expectations are confirmed by data is another means of testing to see if the instrument is measuring what was intended.

The instrument reliability co-efficients indicated in the Cooper and Graham study are reported in Table 2. The two constructs deemed from research, conflict management and resolution as well as cultural diversity, were tested for reliability. To ensure reliability co-efficients for the instrument used in this study, an independent pilot test of the instrument was implemented with two NGOs and university faculty not affiliated with the original participants in this study. Table 2 indicates the reliability co-efficients for the instrument used by Cooper and Graham study and AIAEE members that participated in this study. Garson (2010) suggested that a cutoff as low as .60 is not uncommon for exploratory research, therefore all were included for this study.

Table 2
Reliability Co-efficients for Both Studies

Constructs	Cooper/Graham	AIAEE
Conflict management		.82
Cultural diversity		.86
Management responsibility	.85	.85
Personal skills	.85	.78
Program planning	.90	.77
Professional development	.91	.70
Public relations	.88	.86
Staff relations	.59	.83
Work habits	.69	.86

Results/Findings

Data revealed the respondents perceived all nine constructs to be *important* with mean scores ranging from 4.077 to 4.454. However, none were perceived as being *very important*. To classify the rating of each construct, data were interpreted using the scale of 1.00-1.49 = Not Important, 1.50-2.49 = Low Importance, 2.50-3.49 = Somewhat Important, 3.50-4.49 = Important, and 4.50-5.00 = Very Important. The lowest score for any construct was also personal skills and the highest score was work habits (see Table 3).

Table 3
AIAEE Mean Scores and Standard Deviations for Constructs

Constructs	μ	α	Rating
	N = 60		
Work habits	4.45	0.75	Important
Conflict management	4.37	0.83	Important
Cultural diversity	4.33	0.85	Important
Mgmt responsibility	4.23	0.85	Important
Program planning	4.23	0.73	Important
Pers/prof development	4.23	0.82	Important
Staff relations	4.16	0.82	Important
Public relations	4.13	0.82	Important
Personal skills	4.08	0.87	Important

To generate a deeper understanding of perceptions, participants were then asked to rank the nine constructs from most important to least important. AIAEE members ranked *program planning* as the most important followed by *cultural diversity* and *personal skills*. The least important constructs perceived were staff relations, personal and professional development, and public relations.

The researcher then divided the AIAEE population into two distinct subpopulations: faculty and graduate students. The faculty rated all the constructs important, rating personal skills the lowest and program planning and evaluation the most important. Students perceived five constructs (conflict management, management responsibility, public relations, staff relations and work habits) slightly more important than faculty; student's perceived program planning to be of least importance (see Table 4).

Table 4
AIAEE Subpopulations Mean Scores and Standard Deviations for Constructs

	Faculty N = 50		Graduate Students N = 10		
Constructs	μ	α	μ	α	Difference
Personal skills	4.10	0.84	4.04	0.90	0.06
Public relations	4.11	0.80	4.27	0.76	(0.16)
Staff relations	4.12	0.83	4.43	0.56	(0.22)
Mgmt responsibility	4.23	0.79	4.26	0.93	(0.03)
Pers/prof development	4.25	0.79	4.12	0.91	0.13

Program planning	4.29	0.65	3.94	0.97	0.26
Conflict management	4.36	0.82	4.50	0.65	(0.14)
Cultural diversity	4.39	0.80	4.12	0.92	(0.27)
Work habits	4.44	0.73	4.54	0.64	(0.10)

Note: 1.00-1.49 = not important, 4.50-5.00 = very important.

To deepen the understanding of the AIAEE population's perception of the constructs, the researchers investigated the length of time participants spent working in countries other than the country in which they hold citizenship. Data indicated participants with five or less years rated all constructs important. Those with more than five years of experience in a foreign country perceived constructs "personal skills" and "staff relations" as being somewhat important and the remaining constructs as important. The respondents perceived all nine constructs as being important and ranked program planning, cultural diversity and conflict management the highest (see Table 5). This finding supports the research of the United Nations (2005) who postulated that program planning and understanding the decision making process are important in development. Working with others from foreign countries does increase cultural diversity.

Table 5
AIAEE Number of Years Working in Foreign Country Mean Scores and Standard Deviations for Constructs

	>5 Years N = 45		<5 Years N = 15		
Constructs	μ	α	μ	α	Difference
Personal skills	4.13	0.75	3.91	1.10	0.22
Program planning	4.15	0.72	4.44	0.67	(0.30)
Public relations	4.16	0.69	4.06	1.08	0.11
Pers/prof development	4.20	0.78	4.27	0.93	(0.07)
Staff relations	4.24	0.67	3.89	1.10	0.36
Mgmt responsibility	4.30	0.70	4.04	1.11	0.26
Cultural diversity	4.40	0.70	4.12	1.11	0.28
Conflict management	4.49	0.59	4.02	1.20	0.47
Work habits	4.51	0.58	4.27	1.04	0.24

Note: 1.00-1.49 = not important, 4.50-5.00 = very important.

Another important aspect of the findings suggested the majority of AIAEE members have taught one or less courses that prepare graduate students for entry-level opportunities for international development, only seven have taught three or more courses (see Table 6).

Table 6
Graduate Courses Taught Preparing Students for International Development

Courses	AIAEE Member N = 50	
	f	(P)
None	21	(42.0)
One	13	(26.0)
Two	9	(18.0)

Three	4	(8.0)
Four or more	3	(6.0)
Total	50	(100)

No graduate students indicated they taught a graduate course; therefore only the fifty respondents answered that question. Of the respondents for this question, 21 (42.0%) had taught none, 13 (26.0%) had taught one class, 9 (18.0%) taught at least two courses, 4 (8.0%) had taught three, and 3 (6.0%) had taught four or more courses designed to prepare students for international development.

Conclusions/Recommendations/Implications

The sample of respondents of the AIAEE believed all nine constructs were important and ranked program planning, cultural diversity and conflict management highest. This supports the research of Hassel (2004), Mauro and Hardison (2002), and the United Nations (2005), who advocated that indigenous people should be involved in the planning and decision making process. The United Nations (1995) stated working with others increases cultural diversity, thus allowing for greater understanding of development issues. It was also evident that the majority of AIAEE members sampled spent less than five years living in foreign countries and taught one or less courses relating to international development, thus possibly lacking their own experiences for understanding what competencies are needed in the international sector. According to Irigoin, et al., (2002) experiences play an important role in the development of competencies, it allows for greater understanding of the issues entry-level employees may face in the field.

As developed countries continue to extend aid (human or financial) to developing countries, the need for properly trained development agents will remain. Picket (1998) suggested identifying competencies provides for organizational growth and assists the organization to meet future demands. Academic courses designed to prepare students for international jobs could contain some aspect of the nine competencies listed in this study.

Schultz (1961) indicated knowledge acquisition is an important form of capital and this knowledge was the key in the development and advancement of western societies. If institutions have a greater understanding of the competencies needed for entry-level employees, industry may reduce employee turnover and foster a stronger company performance (Black and Lynch, 2001; Coleman, 1998; Lepak and Snell, 1999; Picket, 1998; and, Quinn, 1992). This understanding would also benefit the educational sector in the preparation of students for positions in the job market (Becker, 1993). Courses containing components of cultural diversity, conflict management, and communication skills could be advantageous to student development. As the economy becomes more global, enhancing students’ understanding of different cultures, conflict management and resolution, and people skills allows students a broader platform when seeking employment and could make them better global citizens.

Based on the findings of the study, perhaps curriculum and course work include conflict management, cultural diversity and work habits. Research conducted by Cooper and Graham (2001), Hassel (2004), Vulpe et al. (2001) and the United Nations (2005) who’s research support this idea. Understanding what competencies are needed in the field could help educators design courses that may better prepare students for careers in international settings (Kock, T. and

Weeks, W., 2012). Educational institutions are on the front-line, they educate students who possibly aspire to work internationally. It may be beneficial for academic institutions be proactive and seek to understand competencies needed to facilitate that outcome. Acker and Grieshop (2004) explained it best "we cannot afford to move into the future using only our rear view mirror" (p. 60). This research has highlighted the view looking out the windshield, possibly giving academia a broader picture of the road ahead.

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Perceptions of Alabama Agricultural Education Teachers Concerning Contextualized Learning- An Evaluation of Progress

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School-based agricultural education

Quantitative

Career and technical education is in a dynamic state. Alabama state career and technical education director, noted that career and technical education in Alabama has undergone significant changes in the last decade. As determined by previous researchers, the importance of agricultural education demonstrating value across the curriculum is vital in today's education climate. The purpose of this study was to examine the perceptions of Alabama agricultural educators regarding the impact of curriculum integration on the achievement of their students and their role in this effort. The population consisted of 161 middle-school and high-school agricultural educators in Alabama. Most teachers either agreed or strongly agreed that integration of mathematics (92.5%, $\bar{x}$ = 3.4) and reading comprehension (87.9%, $\bar{x}$ = 3.2) were important in the agricultural education curriculum. Three-fourths (74.5%, $\bar{x}$=3.0) of the teachers felt lack of appropriate equipment was a barrier to science integration. A majority of teachers felt insufficient funding (90.2%, $\bar{x}$=3.2) and lack of appropriate workshops (65.4%, $\bar{x}$ =2.8) served as barriers.

Introduction and Conceptual Framework

Career and technical education is in a dynamic state. Sherry Key (2008), Alabama state career and technical education director, noted that career and technical education in Alabama has undergone significant changes in the last decade. As determined by previous researchers, "Many jobs require workers to know and apply math and science concepts to be able to properly fulfill the duties set before them" (Hamilton & Swortzel, 2007, p.2). Edwards and Ramsey (2004) posited, "society and the workplace are placing increasing demands on citizens and employees to be scientifically and technologically literate" (p. 87); however, laborer's skill sets have not stayed current with technical knowledge needed to be successful in industry. The National Research Council (1988) noted, "vocational agricultural curriculum has failed to keep up with modern agriculture" (p. 31). Changes to curriculum and courses of study have been called for to update programs and incorporate academic skills required to be successful in today's work place (Parr, Edwards, & Leising, 2006). A change in industry prompting change in education is not new. Such changes were apparent even a century ago when Snedden (1914) stated, "the world is changing and education must change with it" (p. 51). Crunkilton & Finch (1999) noted more than a decade ago, "Demands placed on workers in the new workplace include greater facility in mathematics, science, English, and communication" (p. 8). With new skill requirements, the nature of career and technical education has changed.

To understand the state of career and technical education today, one must consider its past. The roots of vocational education are said to be in Egypt over 4000 years ago (Crunkilton & Finch, 1999). During those times, young people practiced apprenticeships under master craftsmen. These young persons learned, over several years, the craft which subsequently became their occupation. No time was spent learning anything other than that which dealt directly with the craft (Snedden, 1914). This style of training persisted until well into the 19th century. Gradually, thoughts about the education of young people changed (Crunkilton and Finch, 1999).

During the sixteenth century, philosophers began to rethink the apprenticeship and suggested that pupils should learn manual arts in formal school settings (Crunkilton & Finch, 1999). Crunkilton and Finch (1999) noted, "Rousseau's concern about the value of manual arts in education served as a model for other educators…" (p. 5). With emergences (in the late 1700s and early 1800s) of new technologies such as the cotton gin, (Croom, Talbert, and Vaughn, 2005), more emphasis was placed on the need for skilled labor. This thought process and the Industrial Revolution spurred on the movement to establish schools that would provide both skilled and unskilled labor for the factories. The high demand for labor could not wait on persons to complete long apprenticeships. Crunkilton & Finch (1999) noted, "This increased demand almost seemed to correspond with the rapid decline of formal apprenticeship programs in many skilled areas" (p. 5).

In the late 1800's and early 1900's, vocational schools were being established (Crunkilton and Finch, 1999). One of the first schools of agriculture [in the Unites States] was established in Mansfield, Connecticut (1881) on land donated by Augustus Storrs (Ball, Dyer, Osborne, & Phipps, 2008). This school provided instruction in the field of agriculture to boys 15 years of age and older. Following suit, other states appropriated funds for agricultural education including, Rhode Island 1888, New Hampshire 1895, and Alabama 1897 (The National Research

Council, 1988). With the onset of funding and allocations for schools dedicated for the pursuit of agricultural education, educational thinkers developed their own responses to how they should be constructed.

Philosophers such as John Dewey and David Snedden weighed in on how they thought vocational schools or programs should be developed in this early era of American public schools. “John Dewey, drawing on Francis Parker's ideas, founded a laboratory school with a curriculum that progressed from practical experiences (planting a garden) to formal subjects (botany) to integrated studies (the place of botany in the natural sciences)” (Berryman, 1991).

The first director of the Federal Board for Vocational Education, Charles Prosser, strongly supported David Snedden’s ideas of “social efficiency.” Social efficiency is described as an educational framework in which the school sees its role as that of preparing the students to become workers (Larabee, 2010).

Snedden’s address entitled “The Schools of the Rank and File”, which was delivered to the Stanford University alumni in 1900, was inundated with the social efficiency paradigm. Further, Charles Prosser, Snedden’s legislative right arm, was instrumental in developing the Smith–Hughes Act of 1917 and even wrote much of the legislation himself (Larabee, 2010, p. 9). The act established federal funding for vocational education in the United States. Due to the fact that the act provided federal funds for these schools, the federal government would now have a say in the curriculum development. This federal control led to the establishment of minimum curriculum offerings (Crunkilton & Finch, 1999). According to Gordon (1999), “The Constitution of the United States makes no provision for federal support or control of education; however, the federal government has considered vocational education in the national interest to provide federal legislation in support of vocational education” (p. 67). Many curriculum offerings developed from Federal approved criteria were devoid of opportunities for students to “*stretch*” [emphasis added] their brains and use critical thinking skills (Crunkilton & Finch, 1999).

With the advent of the micro-computer and other technologies in the 1970’s and 1980’s vocational schools could no longer afford to teach a static curriculum of job related skills only (Crunkilton & Finch, 1999). Warmbrod (1974) proposed that “if vocational education assumed its proper role in American education that vocational education must be concerned with the student’s intellectual, social, and cultural development as well as their vocational development” (p. 5). Barkey and Kralovec (n.d) noted that, “the workplace of today makes very different demands on workers than did the workplaces our vocational education system was designed to address (p. 1). The shift in industry called for a shift in vocational school curriculum offerings. This paradigm was echoed later by Edwards, Leising, and Parr (2002) when they noted, “society is increasingly dependent on a myriad of complex technologies- ranging from the use of computers to the consumption of genetically modified foods” (p. 5).

In the 1980’s and 1990’s, more funding legislation was passed to provide money for the vocational schools to stay at pace with the machinery and technology in the industrial market place. The legislative act that provided the funding was, and is still known as, the Carl D. Perkins Act (Crunkilton & Finch, 1999). Educational goals established in the Perkins Act are associated with two areas: education for life and education for earning a living (Crunkilton & Finch, 1999). According to the Alliance for Excellent Education (2009), a reauthorization of federal legislation termed as the Elementary and Secondary Education Act (ESEA) or No Child Left Behind (NCLB) says, "The mission of the public education system must shift from educating *some* students and preparing them for the *twentieth-century American* economy to educating *all* students and preparing them for the *twenty-first-century global* economy" (p. 4). This reauthorization has within it a set of college readiness indicators that help assess how well students are being prepared for college.

The reauthorizing of the Carl D. Perkins Act (Public Law 109-270) in 2006 led to the development of increased focus on academic standards within career and technical education. With this legislation, states had to develop ways to achieve the mandates set forth. The Act also set the stage for states to develop ways to assess achievement by students in career and technical education programs and standard education programs in the form of standardized *high stakes* tests. Legislation mandating the integration of academics shifted career and technical education in a new direction.

The conceptual framework that guided this study is rooted in Glasser's choice theory (2001). This theory states that individuals control their behaviors based on knowledge and internal stimuli to do what they feel is best. This theory could be used to explain teacher behaviors when it comes to the delivery of academic subject matter through the context of agricultural education based on their perception of the importance of doing so. Simply, if teachers truly believe that this integration is beneficial to their students, then they will be more inclined to see that it is carried out in the classroom.

Purpose of the Study

The purpose of this study was to examine the perceptions of Alabama agricultural educators regarding the impact of curriculum integration on the achievement of their students and their role in this effort.

This study was based on constructs from which research questions were derived. A questionnaire was administered to agricultural teachers to determine perceived relationships between outcomes on standardized tests and agricultural education course work and agricultural instructors' perceptions of teaching responsibilities as they relate to academic achievement. The constructs were as follows 1) student test taking preparation 2) academic standard integration 3) perceived barriers to science integration and 4) science integration and its relationship to student enrollment.

Research Questions

The following research questions guided this study.

1) Do agricultural education teachers in Alabama feel it is their responsibility to prepare their students for standardized high-stakes tests?

2) Do agricultural education teachers in Alabama feel they should incorporate core academic standards into their instruction?
3) Do agricultural education teachers in Alabama feel there are outside influences that affect how and if science integration takes place in their classrooms?
4) What are the perceptions of Alabama agricultural education teachers regarding student enrollment and the impact science integration plays on it?

The researcher developed questionnaire contained five questions for each construct. Upon approval from the Auburn University Institutional Review Board and representatives of the Alabama Association of Agriscience Educators (AAAE), the researcher distributed the survey at the 2011 annual meeting of Alabama Association of Agriscience Educators in Birmingham, Alabama. The surveys were collected and descriptive statistics, including frequencies, means, and standard deviations were used to summarize the data.

The population consisted of 161 middle-school and high-school agricultural educators in Alabama. This number was determined by the number of teachers that filled out the registration sheet for the AAAE session. It is recognized that teachers who attend the state conference may be very different when compared to those who did not attend, therefore, no generalization may be made beyond this group of 161 teachers.

A survey was provided for each agricultural teacher that attended the AAAE meeting. All session attendees were given the opportunity to complete the survey. Of the 161 educators, 133 completed the survey. According to the American Association for Public Opinion Research (AAPOR, 2011) the response rate is, “The number of complete interviews with reporting units divided by the number of eligible reporting units in the sample” (p.5). By this definition, this survey had a response rate of 82%. The AAPOR determined that response rates over 70% is acceptable.

To answer research questions two through five, an instrument was developed using an instrument previously developed by other researchers in this field (Layfield, Minor, & Waldvogel, 2001; Balschweid & Thompson,2002; Thompson & Schumacher, 1998; Myers & Washburn, 1998). The instrument was modified to meet the requirements of this study. The instrument was reviewed by an agricultural education university professional for face and content validity. Previous researchers report the original instrument internal consistency using Cronbach’s alpha of 0.88 (Thompson & Schumacher, 1998). Cronbach’s alpha for the new instrument is reported at 0.84.

The instrument operationalized the constructs. The first construct, student test taking preparation measured the value that agricultural educators in Alabama place on preparing their students for *high stakes* standardized tests (see Table 1). Each construct contained five items with response options noted as 1 (*strongly disagree),* 2 (*disagree*)*,* 3 (*agree*)*,* 4 (*strongly agree*). The second construct, academic standard integration measured the value that agricultural educators in Alabama place on integrating academic standards in biology, social studies, language arts, mathematics, and reading comprehension into their classroom instruction (see Table 2). The third construct, *perceived barriers to science integration* measured the perspective of agricultural education teachers in Alabama on barriers that limit the amount of science they integrate into their classroom instruction (see Table 3). The fourth construct, perceived relationship of science integration on enrollment measured the perspectives of agricultural education teachers in Alabama regarding relationships between science integration and student enrollment in agricultural programs (see Table 4).

Before implementation of the study, the Alabama State Department of Education, Career and Technical Education, Agriscience section was contacted and an allotted time was given to the researcher to distribute the questionnaire during the 2011 Alabama Career and Technical Education Conference in Birmingham, Alabama. The questionnaire was given to the session chair who distributed and collected the survey. The researcher then retrieved the collected surveys and used SPSS 18 for Windows to calculate descriptive statistics and percentages from the tallied survey responses.

Results

Research question 1 sought to describe the perceptions of agricultural education teachers toward preparing their students for standardized high-stakes tests. A majority of responding teachers (63.1 %) either agreed or strongly agreed that they felt it was their job to prepare students to pass the Alabama High School Graduation Exam (AHSGE) (Table 1). Furthermore, 84.9% either agreed or strongly agreed that students are better prepared for the AHSGE after completing their classes. A majority (94.8%) of teachers either agreed or strongly agreed that it is important that their students pass the AHSGE. Most (85.7%) of the teachers either agreed or strongly agreed that agricultural classes have a place in preparing students for *high stakes* tests. Finally, 81.9% of teachers surveyed feel that students who take agricultural classes are better prepared for passing the AHSGE than students who have not completed an agricultural class.

Table 1
Preparing Students for Standardized Test

Statement	M (SD)	%SD	%D	%A	%SA
I feel it is my job to prepare students for the AHSGE.	2.7(.90)	10.5	26.3	43.6	19.5
I feel students are better prepared for the AHSGE after completing my class.	3.1(.77)	4.5	10.5	54.1	30.8
I feel it is important that my students pass the AHSGE.	3.5(.67)	2.3	3.0	34.6	60.2
I feel that Agriscience has a place in preparing students for *high stakes* tests.	3.1(.76)	3.8	10.5	51.9	33.8
I feel that students in Agriscience are better prepared for passing the AHSGE than students who have not completed an Agriscience class.	3.1(.74)	2.3	15.8	51.1	30.8

Note. *n* = 133. M= mean. SD= Std. Deviation. Scale: 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Agree (A), 4 = Strongly Agree (A).

Research question 2 sought to describe the perceptions of agricultural teachers regarding incorporation of core academic standards into the agricultural education curriculum. Over four-fifths (83.4%) of the respondents reported that integration of biology concepts into the agricultural curriculum was important (Table 2). Slightly more than half (53.4%) of the teachers either agreed or strongly agreed that it is important to integrate social studies in their instruction. Furthermore, most teachers agreed or strongly agreed with the notion that integrating language arts is important (66.2%). Finally, most teachers either agreed or strongly agreed that integration of mathematics (92.5%) and reading comprehension (87.9%) were important in the agricultural education curriculum.

Table 2
Integration of Academic Concepts

Statement	M (SD)	%SD	%D	%A	%SA
I feel it is important to integrate biology into my instruction.	3.1(.81)	6.8	9.8	54.1	29.3
I feel it is important to integrate social studies into my instruction.	2.6(.82)	9.0	37.6	41.4	12.0
I feel it is important to integrate language arts into my instruction.	2.7(.78)	7.5	26.3	53.4	12.8
I feel it is important to integrate mathematics into my instruction	3.4(.70)	2.3	5.3	45.1	47.4
I feel it is important to integrate reading comprehension activities into my instruction.	3.1(.74)	3.8	8.3	52.6	35.3

Note. *n* = 133. M= mean. SD= Std. Deviation. Scale: 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Agree (A), 4 = Strongly Agree (A).

Research question three sought to describe the perceptions of agricultural teachers regarding barriers to integrating science into the agricultural education curriculum (Table 3). Three-fourths (74.5%) of the teachers felt lack of appropriate equipment was a barrier to science integration. A majority of teachers felt insufficient funding (90.2%) and lack of appropriate workshops (65.4%) served as barriers. Conversely, the minority of teachers felt that the lack of having a cooperating science teacher (38.4%) and a lack science competence among agriculture teachers (39.1%) were barriers to science integration.

Table 3
Barriers to Science Integration

Statement	M (SD)	%SD	%D	%A	%SA
Lack of appropriate equipment is a barrier to integrating science into my agricultural education program.	3.0(.78)	3.0	22.6	48.9	25.6
Lack of adequate federal, state, or local funds is a barrier to integrating science into agricultural education programs.	3.2(.66)	1.5	8.3	55.6	34.6
Lack of agriscience workshops for agricultural education teachers is a barrier to integrating science in my class.	2.8(.80)	4.5	30.1	45.9	19.5
Lack of science competence among teachers in agricultural education is a barrier to integrating. science.	2.3(.87)	16.5	43.6	29.3	9.8
Lack of a science teacher who is willing to help me integrate science concepts has been a barrier to integrating science.	2.3(.80)	12.8	48.9	30.1	8.3

Note. *n* = 133. M= mean. SD= Std. Deviation. Scale: 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Agree (A), 4 = Strongly Agree (A).

Research question four sought to describe the perceptions of Alabama agricultural education teachers regarding student enrollment and the impact science integration plays on it (Table 4). A majority (68.4%) of the teachers felt that average ability students are more likely to enroll in agricultural education courses that integrate science. Furthermore, slightly more than half of teachers felt that both low ability students (51.8%) and advanced students (57.1%) were more likely to enroll in agricultural courses that integrated science. Likewise, more than half (54.2%) of the teachers felt integrating science into the agricultural education program more effectively meets the needs of special population students. Finally, the majority (63.2%) of teachers either strongly disagreed or disagreed that enrollment had gone up since they had integrated science.

Table 4
Perceptions on Enrollment in Agricultural Education

Statement	M (SD)	%SD	%D	%A	%SA
High ability students are more likely to enroll in agricultural education courses that integrate science.	2.6(.85)	10.5	32.3	43.6	13.5
Average ability students are more likely to enroll in agricultural education courses that integrate science	2.6(.8)	9.0	22.6	51.9	16.5
Total program enrollment in agricultural education has increased since I integrated science.	2.3(.78)	12.8	50.4	30.1	6.8
Integrating science into the agricultural education program more effectively meets the needs of special population students.	2.5(.80)	9.8	36.1	44.4	9.8
Low ability students are more likely to enroll in agricultural education courses that integrate science.	2.4(.88)	14.3	33.8	39.8	12.0

Note. n = 133. M= mean. SD= Std. Deviation. Scale: 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Agree (A), 4 = Strongly Agree (A).

Conclusions/ Implications

A majority of responding teachers (63.1 %) either agreed or strongly agreed that they felt it was their job to prepare students to pass the AHSGE (Table 1). However, the mean implies ($\bar{x}$ =2.7) that there is a substantial group of teachers feel it is NOT their job to prepare students for the AHSGE. Though the majority do agree test preparation is important, the minority must realize that *testing* is the paramount in current education agendas…per NCLB (USDE, 2001). Without gains in standardized tests and relationships being identified between those gains and career and technical education classes, career and technical education is losing ground on the bureaucratic battle front.

Interestingly, 84.9% ($\bar{x}$=3.1) either agreed or strongly agreed students are better prepared for the AHSGE after completing their classes. A large majority (94.8%, $\bar{x}$=3.5) of teachers either agreed or strongly agreed that it is important that their students pass the AHSGE. Most (85.7%, $\bar{x}$=3.2) of the teachers either agreed or strongly agreed that agricultural classes have a place in preparing students for *high stakes* tests. After looking at these responses, the question must be posed, “If teachers feel it is important to pass the AHGE and they feel students are better prepared for passing by taking agricultural classes, why do many not feel it is their job to help prepare their students for passing the exam?” With increased scrutiny and waning budgets many teachers might soon realize improving test scores will help secure a place at the policy table for career and technical education. Finally, 81.9% ($\bar{x}$=3.1) of teachers surveyed feel that students who take agricultural classes are better prepared for passing the AHSGE than students who have not completed an agricultural class.

The majority (83.4%) of the respondents reported that integration of biology concepts into the agricultural curriculum was important (Table 2). The mean implies ($\bar{x}$ = 3.1) that the teachers felt science was important in the agricultural curriculum, which is consistent with research done by Myers & Washburn (1998).

Slightly more than half (53.4%) of teachers either agreed or strongly agreed that it is important to integrate social studies into their instruction. The mean implies ($\bar{x}$ = 2.6) that many of the teachers felt social studies was NOT important. A lower indicator of importance may be indicative of little social studies content in the course work of agricultural education classes.

Most teachers agreed or strongly agreed with the notion that integrating language arts is important (66.2%). The mean implies ($\bar{x}$ = 3.1) that most teachers felt language arts was important. This falls in line with one of the main topics of research for the National Research Agenda: Agricultural Education and Communications. Student literacy is a focus of research being conducted (Doerfert, 2011).

Finally, most teachers either agreed or strongly agreed that integration of mathematics (92.5%, $\bar{x}$ = 3.4) and reading comprehension (87.9%, $\bar{x}$ = 3.2) were important in the agricultural education curriculum.

Three-fourths (74.5%, $\bar{x}$=3.0) of the teachers felt lack of appropriate equipment was a barrier to science integration. A majority of teachers felt insufficient funding (90.2%, $\bar{x}$=3.2) and lack of appropriate workshops (65.4%, $\bar{x}$=2.8) served as barriers. These findings are consistent with a study conducted by Balschweid, Cole, & Thompson (1998) that noted, “Teachers indicated the greatest barriers to implementing agriculture into existing lessons were the time necessary for curricula changes and access to necessary supplies/materials/information” (p. 8).

Conversely, the minority of teachers felt that the lack of having a cooperating science teacher (38.4%, $\bar{x}$=2.3) and a lack science competence among agriculture teachers (39.1%, $\bar{x}$ =2.3) were barriers to science integration. This is consistent with findings of Myers & Washburn (1998) where they reported only 33.5% of agricultural instructors felt they had insufficient background in science content to integrate it into their curriculum. This could be attributed to the fact that many agricultural educators feel they are knowledgeable enough about science concepts such that no science curriculum specialist would be needed.

A majority (68.4%) of the teachers felt that average ability students are more likely to enroll in agricultural education courses that integrate science. This is consistent with Myers & Washburn (1998) when they report that 61.8% of their surveyed population believed enrollment of average ability students would go up with science integration. Furthermore, slightly more than half of teachers felt that both low ability students (51.8%) and advanced students (57.1%) were more likely to enroll in agricultural courses that integrated science. These results both coincide with and confound Myers & Washburn’s (1998) results. They indicated that only 30.4% of teachers felt low achieving student enrollment would increase, whereas 73.5% of teachers believed high achieving student enrollment would increase with science integration. More than half (54.2%) of the teachers felt integrating science into the agricultural education program more effectively meets the needs of special population students. Myers and Washburn report only 42.9% of teachers in their study believed science integration would benefit special needs populations. Finally, the majority (63.2%) of teachers either strongly disagreed or disagreed that enrollment had gone up since they had integrated science. This may be due to the fact that many teachers believe that agriculture is already latent with science; therefore, they do not believe enrollment would be increased if more science content was added.

With such weight being put on accountability of instruction and accountability being operationalized in the form of student performance on standardized tests, career and technical education must develop ways to enhance student scores while not losing sight of its raison d'etre (Parr, Edwards, and Leising, 2008). This study was done to explore the current perceptions of agricultural education in preparing students for standardized high stakes tests. Also, this study sought to determine the barriers that agricultural teachers feel are present in preventing models of academic integration. Research cited in this study provides evidence that such integration models could help enhance scores on standardized tests; however, one must realize that a multitude of variables must be in place for such models to succeed. The most important of those variables is an agricultural instructor willing to break the mold of the old vocational agricultural class and learn how to enhance the curriculum and bring out concepts that are on standardized tests. The data presented in this study suggests that while many agricultural educators believe that they have a role in preparing students for success in other academic content areas, many agricultural educators do not. This implies that a group of teachers have not bought into the concept of becoming holistic educators and may still see themselves primarily as vocational trainers. These perceptions must continue to change as the old adage “perception is reality” most likely hold true within this group.

Recommendations/ Implications

1) Efforts should be made to provide training for agricultural educators on how to better incorporate or bring out content that is already in the agricultural curriculum so that they can see the connections between agricultural education and other academic content areas.

2) Administrators should allow for collaboration periods between core teachers and agriculture teachers so that common academic themes might be identified. Strategies could then be developed to reinforce those standards using agriculture as the context for teaching.

3) Professional development should be provided to administrators, state educational staff, core academic teachers and agricultural teachers regarding the benefit of curriculum integration.

4) Research should be done to assess agriculture teacher attitudes regarding preparing students for high stakes tests. Demographics such as age, years of teaching experience,

and education level should be collected so that new inferences can be made about the makeup of teachers in the agricultural education profession.

The researcher was confounded that more agriculture teachers do not consider preparing students for standardized tests as part of their job. Several explanations are offered. 1) Respondents might feel that their only job is to teach the curriculum set forth by the state of Alabama. No agricultural class has within its standards any statute that dictates that agricultural teachers should teach to a test. 2) There may be a generation gap among agriculture teachers in the sample population which would inherently render different perspectives. Many older agricultural teachers (those with 30 + years of teaching) could have different opinions about students passing the AHSGE. This could be due to the fact that the AHSGE started in 1983. Many older educators never experienced having to pass a high stakes test in order to graduate from high school; whereas agriculture teachers with fewer years of experience did. These younger teachers could have a better understanding of the necessity for passing the AHSGE since they had to accomplish that goal before continuing their education. This could lead to another topic of research for study.

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Science Concepts Included in Courses Taken by Preservice Agricultural Education Teachers

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Abstract

This case study sought to identify the science concepts that preservice teachers had an opportunity to learn through coursework taken to complete their degree. It was found that 170 different courses were taken by the 59 preservice teachers to satisfy degree requirements in science. Of that, 73 different courses were taken in core sciences to satisfy the 9 credit hour requirement and 97 courses were taken in applied agricultural science to satisfy the 30 credit hours required. Using the science standards referenced in the AFNR Career Cluster Standards, students had the opportunity to learn the standards associated with Science as Inquiry, Life Science, Science in Personal & Social Perspectives, and the History & Nature of Science. In contrast, very few students had the opportunity to learn the standards associated with Physical Science and Earth & Space Science. The findings imply changes should be made in the courses taken by preservice teachers. Although this case study included data from only one university, the results herein may have implications for other universities, especially programs that have a large number of students that transfer from a community college. The research protocols established in this study can provide a transferrable model for examining this issue.

Introduction

Beginning with the 1988 National Research Council (NRC) report, agricultural education has steadily increased emphasis on science instruction integrated into the agriscience classrooms. With this emphasis on integration, teachers are being required to teach science concepts more explicitly. This emphasis has been so wide-spread that state legislation, as well as the national Carl D. Perkins Career and Technical Education Act (2006), have demanded more rigorous content taught in CTE courses (Public K-12 Educational Instruction, 2010). The emphasis continued via national calls for increasing science learning opportunities for students through reformed methods of teaching science (AAAS, 1989, 1993; NRC, 1996). The general message has been that agricultural education courses are great vectors for applying science concepts. Yet the underlying question is, are agricultural education teachers prepared for this task?

Theoretical Framework

This study was framed using an assumption that teachers need content knowledge, pedagogical knowledge, and pedagogical content knowledge (Roberts & Kitchel, 2010). Content knowledge refers to an understanding of subject matter and curriculum goals, pedagogical knowledge refers to standards of teaching, learning, and how learners develop, and pedagogical content knowledge refers to abilities to teach specific content matter (Bransford et al., 2000; Roberts & Kitchel, 2010). This study specifically examined content knowledge.

Several studies have begun to look at the issue of content knowledge. Teachers from Arkansas were surveyed for undergraduate courses taken in science to satisfy their degree requirement. Respondents took the most courses in biology, followed by chemistry, while physics was taken the least (Johnson, 1996). Earth science courses had the highest level of teacher success in undergraduate courses, while chemistry courses saw the lowest level of achievement during teachers' undergraduate studies (Johnson, 1996).

Other research showed that a lack of understanding science concepts is a deterrent to science integration. Preservice teachers felt insufficient in background knowledge in science content (Thoron & Myers, 2010). Additionally, Warnick and Thompson (2007) demonstrated that science teachers and agriculture teachers felt that agriculture teachers had a lack of science competence and that this was a barrier to integrating science.

Teachers' perceptions may not correspond with their capabilities. Secondary school agriculture teachers in Missouri felt capable of teaching all but one science standard from the state standards (Scales, Terry, & Torres, 2009). When the same population was assessed for their science content proficiency, less than 10% of the sample placed at the 'proficient' level for science competence (Scales et al., 2009). Thus, agricultural science teachers demonstrated a lack of mastery of content. In a separate study, one-third of Florida teachers perceived that insufficient background as a barrier (Myers & Washburn, 2008). However, the typical respondent for this study was a 15-year teacher veteran with at least a bachelor's degree in a field other than agricultural education, so these findings may not be indicative of new graduates.

Based on the literature above, many researchers have examined the science content knowledge of agricultural education teachers. These studies give insight into *what* teachers know, but not *where* and *how* they learned what they know. Only one study examined the coursework of preservice teachers and that study relied on secondary data (Johnson, 1996). This study will add to the understanding of this problem by using primary data from student records.

Purpose and Objectives

This purpose of this case study was to identify the science concepts that preservice teachers had an opportunity to learn as a part of their degree program. The objectives were:

1. List the courses taken by preservice teachers to satisfy the science requirements; and
2. Describe the science concepts included in those courses.

Methodology

This case study sought to identify the science competencies experienced by preservice teachers based on the National Agriculture, Food and Natural Resources (AFNR) career cluster content standards (National Council for Agricultural Education [NCAE], 2009). The science competencies are those standards from the National Science Education Standards aligned to the AFNR career cluster content standards (National Academy of Sciences, 1995; NCAE, 2009). There were 33 science standards present in the AFNR Standards (Table 1).

Table 1
Science Standards Referenced in the AFNR Career Clusters' Content Standards

Standard	Benchmark Number and Description	
A	*Content Standard: Science as Inquiry*	
	A1	Identify questions and concepts that guide scientific investigation.
	A2	Design and conduct scientific investigations.
	A3	Use technology & mathematics to improve investigations and communications.
	A4	Formulate & revise scientific explanations & models using logic and evidence.
	A5	Recognize and analyze alternative explanations and models.
	A6	Communicate and defend a scientific argument.
B	*Content Standard: Physical Science*	
	B1	Structure of atoms.
	B2	Structure and properties of matter.
	B3	Chemical reactions.
	B4	Motions and forces.
	B5	Conservation of energy and increase in disorder.
	B6	Interactions of energy and matter.
C	*Content Standard: Life Science*	
	C1	The cell.
	C2	Molecular basis of heredity.
	C3	Biological evolution.
	C4	Interdependence of organisms.
	C5	Matter, energy, and organization in living systems.
	C6	Behavior of organisms.
D	*Content Standard: Earth and Space Science*	
	D1	Energy in the earth system.
	D2	Geochemical cycles.
	D3	Origin and evolution of the earth system.
	D4	Origin and evolution of the universe.
E	*Content Standard: Science and Technology*	
	E1	Abilities of technological design.
	E2	Understanding about science and technology.
F	*Content Standard: Science in Personal and Social Perspectives*	
	F1	Personal and community health.
	F2	Population growth.
	F3	Natural resources.
	F4	Environmental quality.
	F5	Natural and human-induced hazards.
	F6	Science and technology in local, national, and global challenges.
G	*Content Standard: History and Nature of Science*	
	G1	Science as human endeavor.
	G2	Nature of scientific knowledge.
	G3	Historical perspectives.

A descriptive case study design was used to identify the science concepts that preservice teachers experienced throughout their degree programs. A descriptive case study presents a summary using numbers to characterize the different groups or individuals in an existing phenomenon (MacMillan & Schumacher, 2010). Courses taken to complete degree requirements were analyzed in two forms for the inherent science competencies. The researchers conducted a content analysis of the course syllabi, followed by a survey of instructors for validation. For each assessment, standards were evaluated as: (a) being present within the course, (b) standards needed prior to taking the course, or (c) a standard unrelated to the course.

For objective one, the population was courses taken by the 59 preservice teachers at [university] to satisfy degree requirements in core science and applied agricultural sciences over a five-year period (N = 170 courses). The sample for objective two was courses taken by a minimum of 10% of the students in the population from objective one (n = 33 courses). Researchers deemed that using the baseline of 10% removed atypical courses.

Student records were the original data source used to generate the list of courses for objective one. Approval was gained from the Institutional Review Board to have a third-party strip identifying information from the records. After the records were stripped, the researchers compiled and classified the list of courses into science and non-science courses to remove non-applicable courses. Then the science courses were further categorized as core science courses or applied agricultural science courses (MacMillan & Schumacher, 2010). The classification was completed using a coding book that was reviewed by a panel of experts and based on the [university] course catalog ([university], 2012). It is important to note that preservice teachers at the [university] often transfer to the university after completing some courses in the community college system. Core science courses were often completed at a community college.

Data for objective two were analyzed through a content analysis. Quantitative content analysis was defined by Berelson (1952) as “a research technique for the systematic, objective, and quantitative description of the manifest content” (p. 18). In this study, the manifest content was the science content expressed in the course syllabi. The assessment of such content requires interpretation of content supported by theoretical rationales and empirical evidence (Messick, 1989; Rourke & Anderson, 2004). According to the AFNR standards there are thirty-three science standards, which became the theoretical rationale for content assessment.

To ensure the data are reliably assessed, objectivity of coding is the main premise (Rourke, Anderson, Garrison, & Archer, 2001). As with test validity, a clearly defined coding protocol increases the objectivity of the coding procedure and in turn the reliability (Rourke et al., 2001). The protocol was defined as the science standards from the AFNR standards, which have been defined by a panel of experts (NCAE, 2009). To validate and elaborate on the content analysis of syllabi, instructors of the courses were also surveyed. To identify the point of contact, faculty were identified by the syllabi, by contacting department correspondents, or by recommendation by other faculty. Faculty were contacted via email with an electronic survey in accordance with the Tailored Design Method from Dillman, Smyth, and Christian (2009).

The same AFNR standards were items of the survey distributed to the identified instructors. The survey items asked instructors to judge whether the content of the science standards was: (a) present, (b) a prerequisite for, or (c) not a part of the course they taught. The researchers designed the survey instrument, and therefore the validity of the instrumentation needed to be established. Test validity relates to the appropriateness, meaningfulness, and usefulness of the numeric sores which are used to make the inferences for conclusions (MacMillian & Schumacher, 2010). To ensure that the inferences from the data collected were valid, the content of the items within the survey was based on domains of the science content as defined by a panel of experts (MacMillian & Schumacher, 2010). The science standards used for the survey items were defined by experts as part of the national academic standards for science. The science standards were defined through four years of work by twenty-two scientific and science education societies and over 18,000 individual contributors (National Academy of Sciences, 1995). These standards were aligned to the AFNR standards by a panel of experts, which consisted of both core academic and agricultural teachers (NCAE, 2009).

Results

Courses Taken by Preservice Teachers

Students took 170 different courses to satisfy the degree requirements for science and applied agricultural science. The courses were segregated into *core* science and *applied agricultural* science. Students took a total of 73 different courses to satisfy their degree requirements in core science (Table 2). Students took a total of 97 different courses to satisfy their degree requirements in applied agricultural science (Table 2). Of the 73 core science courses, 14 courses were taken by a minimum of 10% of the population. Of 97 applied agricultural sciences courses, 19 courses were taken by a minimum of 10% of the population.

Table 2
Courses Taken to Satisfy Science Degree Requirements of Preservice Teachers

Courses		Frequency
Core Science Courses		
BSC 2010	Integrated Principles of Biology 1	37
BSC 2007	Cells, Organisms and Genetics	35
BSC 2010L	Integrated Principles of Biology Laboratory 1	35
CHM 1025	Introduction to Chemistry	24
BSC 2005L[1]	General Education Biology Laboratory	23
BSC 2011	Integrated Principles of Biology 2	22
CHM 2045	General Chemistry 1	22
CHM 2045L	General Chemistry 1 Laboratory	21
CHM 1025L[1]	Introductory Chemistry Lab	19
BSC 2011L	Integrated Principles of Biology Laboratory 2	18
BSC 2009L	Laboratory in Biological Sciences	10
CHM 1083[1]	Chemistry for Consumers	10
CHM 2046	General Chemistry 2	10
CHM 2046L	General Chemistry 2 Laboratory	9
Agricultural Science Courses		
ANS 3006C	Introduction to Animal Science	58
AOM 3220	Agricultural Construction and Maintenance	58
SWS 3022[P]	Introduction to Soils in the Environment	58
SWS 3022L[P]	Introduction to Soils in the Environment Lab	58
FOS 2001[B]	Man's Food	39
ENY 3005[B]	Principles of Entomology	26
ENY 3005L[B]	Principles of Entomology Lab	25
PLS 3004C[B]	Principles of Plant Science	24
ENY 3007C	Life Science	24
WIS 2040[B]	Wildlife Issues in a Changing World	18
ANS 2002	The Meat We Eat	12
PKG 3001	Principles of Packaging	11
VEC 2100[B]	World Herbs and Vegetables	10
IPM 3022	Fundamentals of Pest Management	9
ORH 1030	Plants, Gardening and You	7
SWS 2007[P]	World of Water	7
AGG 3501[B]	Environment, Food and Society	6
HOS 3020	Principles of Horticulture Crop Production	6
VEC 3221C	Vegetable Production	6

Note. There were a total of 59 preservice teachers; [1]Courses completed at community colleges. [B]Courses count as biological science credit; [P]Courses count as physical science credit.

Science Standards Present in Courses Taken by Preservice Teachers

The 33 courses were examined to identify the presence of standards and benchmarks. Data could not be retrieved for 4 courses, AGG 3501, PKG 3001, PLS 3004C, and SWS 3022L. All benchmarks for standard A: *Science as Inquiry* were included in the following courses: BSC

2010L and BSC 2011L. No applied agricultural science course included or prerequired exposure to all standard A benchmarks. Courses BSC 2011 and ORH 1030 have no benchmarks from standard A. The complete matrix of courses and standards A and B is included in Table 3.

Table 3

Science as Inquiry (A) and Physical Science (B) Standards Present in Courses

	Science as Inquiry						Physical Science					
Course	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6
BSC 2005L	X	X		X	X	X	P	P	P	P	P	P
BSC 2007	X	X				X			X		X	
BSC 2009L	X	X			X	X	P	P	X			
BSC 2010	X	X		X	X	X	X	P	X		X	X
BSC 2010L	X	X	X	X	X	X	P	P	X	P	P	X
BSC 2011							P	P	P	P	P	P
BSC 2011L	X	X	X	X	X	X			X			X
CHM 1025	X		X				X	X	X	X	X	X
CHM 1025L	X	X	P	X	X	X	X	X	X		X	X
CHM 1083	P	X	P	X	X	X	X	X	X		X	X
CHM 2045	X		P				X	X	X	X	X	X
CHM 2045L	X	X	X	P	P	X	P	X	X	X	X	X
CHM 2046	X	X		X	X	X	P	X	X		P	X
CHM 2046L	X	X		X	X	X	P	P	X		P	P
AGG 3501	*	*	*	*	*	*	*	*	*	*	*	*
ANS 2002	X		P	X	X	X	P	P	P			
ANS 3006C	P		X		X	X	P	P	P	P	P	P
AOM 3220	P		X		P	P	P	P	P	P	P	P
ENY 3005	X			X	X	X						
ENY 3005L	X		X	X		X						
ENY 3007C	X	X	X									
FOS 2001	X				X	X	P	X	X		X	
HOS 3020	X		X			P						
IPM 3022	X			X	X	X						
ORH 1030												
PKG 3001	*	*	*	*	*	*	*	*	*	*	*	*
PLS 3004C	*	*	*	*	*	*	*	*	*	*	*	*
SWS 2007	X		P	X	X		X	X	X	X	X	X
SWS 3022	X		P	X	X	P	P	P	P	P	P	P
SWS 3022L	*	*	*	*	*	*	*	*	*	*	*	*
VEC 2100	P	X	X			X			X			
VEC 3221C		X	X	X	X	X			X			
WIS 2040	X				X	X						

Note. X means standard present in course, P mean standard is a prerequisite, * = no response.

Standard B: *Physical Science* was included primarily in core science courses. The courses CHM 1025, CHM 2045, and SWS 2007 included all of the benchmarks for standard B. Benchmark B3: Chemical reactions was present or a prerequisite in all core science courses.

Three applied agricultural science courses, FOS 2011, VEC 2100, and VEC 3221C, included at least one benchmark from standard B. The applied agricultural science courses ANS 3006C and SWS 3022 required prior knowledge of all benchmarks in standard B. A complete matrix of courses and benchmarks for standard B is presented in Table 3.

Standard C: *Life Sciences* was included in all BSC biology core science courses, and not present in any CHM chemistry courses. Additionally, the courses BSC 2005L, BSC 2007, and BSC 2010 included all benchmarks for standard C. The applied agricultural courses ANS 2002, AOM 3220, ANS 3006C, ENY 3005, and ENY 3007C required prior knowledge or included all benchmarks for standard C. A complete matrix for standard C is presented in Table 4.

Standard D received less attention in the courses taken by preservice teachers. Benchmark *D4: Origins and evolution of the universe* was not included in any course. However, BSC 2011 and AOM 3220 required prior knowledge of the benchmark. A complete matrix of courses and benchmarks for Standard D is presented in Table 4.

Table 4
Life Science (C) and Earth & Space (D) Standards Present in Courses

	Life Science						Earth & Space Science			
Course	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4
BSC 2005L	X	X	X	X	X	X		X	P	
BSC 2007	X	X	X	X	X	X	X			
BSC 2009L	X	X	X	X	X		X	X	X	
BSC 2010	X	X	X	X	X	X	X	X	X	
BSC 2010L	X	X	X	X					X	
BSC 2011	P	P	P	P	X	X			P	P
BSC 2011L	P	P	X	X	X		X	X	X	
CHM 1025										
CHM 1025L										
CHM 1083										
CHM 2045										
CHM 2045L										
CHM 2046										
CHM 2046L										
AGG 3501	*	*	*	*	*	*	*	*	*	*
ANS 2002	P	P	P	P	P	P	P	P		
ANS 3006C	P	X	P	P	X	X				
AOM 3220	P	P	P	P	P	P	P	P	P	P
ENY 3005	P	P	X	X	P	X				
ENY 3005L	P	P	P	X		X				
ENY 3007C	P	P	X	X	X	X		X		
FOS 2001	X	X	X	X	X					
HOS 3020	P									
IPM 3022		P	P	X	X	X				
ORH 1030			X	X		X			X	
PKG 3001	*	*	*	*	*	*	*	*	*	*
PLS 3004C	*	*	*	*	*	*	*	*	*	*
SWS 2007			X	X	X		X	X	X	
SWS 3022				X	X		X	X	P	
SWS 3022L	*	*	*	*	*	*	*	*	*	*
VEC 2100	X	X	X							
VEC 3221C		X	X	X	X	X	X	X		
WIS 2040	X		X	X		X		X		

Note. X means standard present in course, P mean standard is a prerequisite, * = no response.

The complete matrix for standard E and standard G is presented in Table 5. All applied agricultural science courses (excluding ANS 2002 and SWS 3022) included benchmark *E2: Understanding about science and technology*. CHM 2045 is the only course that included no benchmarks from standard *G: History and Nature of Science.* Of the 33 courses, 10 included all three benchmarks from standard G.

Table 5

Technology (E) and History & Nature of Science (G) Standards Present in Courses

	Technology		History & Nature of Science		
Course	E1	E2	G1	G2	G3
BSC 2005L			X	X	X
BSC 2007		X		X	X
BSC 2009L		X		X	
BSC 2010			X	X	
BSC 2010L	X	X	X	X	
BSC 2011	X	X	P	P	P
BSC 2011L	X	X	X	X	X
CHM 1025				X	X
CHM 1025L		X		X	
CHM 1083	X	X	X	X	X
CHM 2045		P			
CHM 2045L		X	P	X	P
CHM 2046		P	X	X	X
CHM 2046L			X	X	
AGG 3501	*	*	*	*	*
ANS 2002	P	P	X	X	X
ANS 3006C	X	X	P	P	X
AOM 3220	X	X	P	P	X
ENY 3005		X	X	X	X
ENY 3005L		X	X	X	
ENY 3007C		X	P	X	X
FOS 2001		X	X	X	X
HOS 3020		X			X
IPM 3022		X	P	P	X
ORH 1030		X	X		X
PKG 3001	*	*	*	*	*
PLS 3004C	*	*	*	*	*
SWS 2007	X	X	X	*	X
SWS 3022	*	*	X	X	X
SWS 3022L	*	*	*	*	*
VEC 2100	X	X	X	X	X
VEC 3221C	X	X	X	X	X
WIS 2040		X	P	X	X

Note. X means standard present in course, P mean standard is a prerequisite, * = no response.

For standard F*: Personal and Social Perspectives* the following courses included all of the benchmarks: BSC 2009L, BSC 2011L, ANS 2002, ANS 3006C, AOM 3220, IPM 3022, and SWS 2007. With one exception, all applied agricultural science courses included benchmarks *F3: Natural resources* and *F6: Science and technology in local, national, and global challenges*. The lacking courses were FOS 2001, for benchmark *F3*, and HOS 3020 for benchmark *F6*. The core science courses CHM 1025, CHM 2045, and CHM 2045L included no benchmarks from this standard. A complete matrix of standards and courses is presented in Table 6.

Table 6

Personal and Social Perspectives (F) Standards Present in Courses

Courses	F1	F2	F3	F4	F5	F6
BSC 2005L		X	X		X	X
BSC 2007		X	X	X	X	X
BSC 2009L	X	X	X	X	X	X
BSC 2010		X				X
BSC 2010L						X
BSC 2011	X	P	P	P	P	P
BSC 2011L	X	X	X	X	X	X
CHM 1025						
CHM 1025L			X			
CHM 1083	X		X	X	X	X
CHM 2045						
CHM 2045L						
CHM 2046				X		
CHM 2046L					X	
AGG 3501	*	*	*	*	*	*
ANS 2002	X	X	X	X	X	X
ANS 3006C	X	X	X	X	X	X
AOM 3220	X	X	X	X	X	X
ENY 3005		P	P			X
ENY 3005L			X			X
ENY 3007C		X	X	X		X
FOS 2001	X				X	X
HOS 3020	X		X	X		
IPM 3022	X	X	X	X	X	X
ORH 1030			X	X		X
PKG 3001	*	*	*	*	*	*
PLS 3004C	*	*	*	*	*	*
SWS 2007	X	X	X	X	X	X
SWS 3022		P	X	X	X	X
SWS 3022L	*	*	*	*	*	*
VEC 2100	X		X		X	X
VEC 3221C	X		X	X	X	X
WIS 2040		X	X	X	X	X

Note. X means standard present in course, P mean standard is a prerequisite, * = no response.

Conclusions, Implications, and Recommendations

Course Enrollment Patterns

Students completed a wide variety of courses to satisfy degree requirements. A total of 73 different courses were taken to satisfy the requirement of nine credit hours in science. Biology courses were taken most frequently and BSC 2010 Integrated Principles of Biology 1 was taken the most frequently, in tandem with the corresponding laboratory. An introductory chemistry course, such as CHM 2045 General Chemistry 1 or CHM 1083 Chemistry for Consumers, was also taken by the majority. Therefore, it is concluded that students typically complete a biology and a chemistry course, which is consistent with the literature (Johnson, 1996).

From the data it was also concluded that students are not taking advanced science courses. Less than half of the students took the second level of biology or chemistry. Just over a third of the students took Integrated Principles of Biology 2 to satisfy degree requirements while only one in six students took General Chemistry 2. This was also demonstrated by the infrequent completion of other advanced science courses, such as microbiology or anatomy and physiology.

Few agricultural education students took physical science courses, which was consistent with what Johnson (1996) found in an earlier study. Of the 73 various courses taken, seven courses were taken in physics, and five courses were taken in a physical or earth and space science. Additionally, only one or two students took these courses. It was concluded that students are not taking core science courses that will expose them to physical science principles.

Course taking patterns for applied agricultural science courses were also quite variable. Students took 97 different courses to satisfy the 30 credit hours of applied agricultural science required. The course-taking pattern aligned with the degree plan; all students took an introduction to animal science, introduction to soil science, and an introductory entomology course. Outside of the three prescribed courses, students took a great variety of courses to satisfy the remaining requirements, with animal science courses being the most frequent.

The variability of the courses taken is exacerbated by the high propensity for unique courses taken by students. Over half of the core science courses and over two-fifths of the applied agricultural science courses were taken by only one student. Additionally, only 33 of all courses taken were taken by at least six preservice teachers. It is concluded that the high variability of courses will yield a high variability in the science concepts that students learn.

Science Standards Present in Courses

The missing data for four courses is a limitation of this study. However, it may not be much of an issues because only 6 students took AGG 3501 and only 11 students took PKG 3001. SWS 3022L is linked with SWS 3022 and thus the responses related to SWS 3022 should be applicable, so that omission is probably negligible. The most problematic course is PLS 3004C, taken by 24 students. As an introductory plant science course, it is probably safe to assume that most of the *Life Science* (C) standards are included or prerequisites, but the extent of the inclusion of the other standards is unknown.

For the content standards B: *Physical Science* and C: *Life Science*, the results yielded expected outcomes. The physical science standards were covered predominantly by the chemistry courses and not in the biological or applied agricultural science courses. The opposite was true for the life science standards, which were present in the biological and applied agricultural science courses while not in the chemistry courses. Since all preservice students completed the introductory animal science and introductory soil science courses, they experienced the application all of the physical science standards. The life science standards were prerequisite standards, as well as present, in many applied agricultural science courses.

For the content standard D: *Earth and Space Science* far fewer courses taught or required knowledge on the component benchmarks. Additionally, benchmark *D4: Origin and Evolution of the Universe* was not present in any courses. Benchmark *B4: Motions and Forces* was only present in two different chemistry courses and one applied agricultural science course. It is concluded that preservice teachers may be deficient in this area.

For the standards A: *Science as Inquiry*, E: *Science and Technology*, F: *Personal and Social Perspectives*, and G: *History and Nature of Science* a myriad of courses in both core science and applied agricultural sciences contain or require prior experience in these standards. This follows with the expectations of such courses based on the descriptions and objectives of the courses related to these standards from the university requirements ([university], 2012). These standards are described as science skills within the literature (NCAE, 2009).

Preservice teachers in this study experienced all the life science and most physical science standards, excluding motions and forces, and earth and space science standards. Based on the existing literature on perceptions and barriers, the findings of this study support the plausibility that preservice teachers feel unable to integrate science content based on insufficient content knowledge of science related to physics and earth and space science. However, the current study would suggest that teachers should be comfortable for biological and chemical science content based. This is contradictory to some of the literature (Johnson, 1996; Scales et al., 2009; Thompson, 1998; Thoron & Myers, 2010; Warnick & Thompson, 2007).

Teacher educators at [university] should consider making changes to the required course of study. To combat the high level of variability within the courses chosen, a set of prescribed courses should be developed to meet the core science requirements for graduation. Typically, 9 credits translate into 3 courses. It is recommended that the course of study reflect the three content areas from the AFNR standards: Biology, Chemistry and Physics, and Earth and Space science. Therefore, one prescribed course in Biology, one prescribed course in Chemistry and/or Physics, and one prescribed course in Earth and Space science should be included.

The following are recommendations for the applied agricultural science courses within the course of studies. The three prescribed courses, ANS 3006C, AOM 3220, and SWS 3022 cover all standards either as a prerequisite or in the course, except *A2: Design and conduct scientific investigations.* The course AOM 3220 should be further investigated based on what content is actually being taught in the course. The instructor's responses yield a muddled picture about the science content in the course. Based on the description of the AOM course, content from the standard *B: Life Sciences* was expected to be outside of the scope of the course, yet the instructor responded to the instrument with a prerequisite for the life science knowledge.

Courses similar in rigor to the three prescribed courses should be further identified and included within the course of studies for agricultural education students. The variability of courses students are allowed to choose minimizes the ability to ensure that students continue to gain experience with science concepts they will be expected to teach. Much like the entomology credits, it is recommended that prescribed choices be established for applied agricultural science credits. As an example, the course VEC 3221C Vegetable Production was taken by only 6 preservice students but contained nearly 70% of the standards.

Although this case study included data from only one university, the results herein may have implications for other universities, especially programs that have a large number of students who transfer from a community college or offer great flexibility in course options for students. Teacher educators at other programs should examine their required coursework using a lens of the science standards to determine the extent that preservice teachers have the opportunity to learn the needed science content knowledge (Roberts & Kitchel, 2010). The research protocols established in this study can provide a transferrable model for examining this issue.

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Correlation of Secondary Agricultural Education Students' Science Achievement to FFA and Supervised Agricultural Experience Participation

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Correlation of Secondary Agricultural Education Students' Science Achievement to FFA and Supervised Agricultural Experience Participation

Abstract

The purposes of this study were to describe the science achievement of secondary agricultural education students both regular education and special education to determine if FFA and Supervised Agricultural Experience (SAE) participation held a relationship with students' performance on science achievement when compared to students who did not participate in FFA and SAE. The FFA activity level of regular education and special education agricultural education concentrators did not hold a statistically significant relationship with science achievement on the Georgia High School Graduation Test (GHSGT) The SAE activity level of regular education and special education agricultural education concentrators did not hold a statistically significant relationship with science achievement on the GHSGT Even though the FFA and SAE data did not show statistical significance, these components were integral parts of agricultural education programs that reiterated classroom concepts to improve academic performance.

Introduction

McLure and McLure (2000) reported that after-school activities involving science improved ACT Science Reasoning test scores. An integral part of agricultural education programs is participation in the student organization, FFA. Through participation in FFA, students develop analytical and communication skills required to be successful in science-based careers. For example, one FFA event that combines these two skills is the Agriscience Fair career development event (CDE). To compete in this event. students utilize the scientific method to independently design and conduct agriculturally related experiments by determining hypotheses, conducting research, gathering and analyzing data, synthesizing conclusions, and making recommendations. After completing experiments, students visually and orally communicate the scientific findings on display boards and explain their experiments to panels of judges (National FFA Organization, 2011a).

Supervised Agriculture Experience (SAE) is another integral component of agricultural education and is defined as extensions of classroom instruction utilizing applicable situations in traditional and non-traditional settings (Newcomb, McCracken, Warmbrod, & Whittington, 2004; Phipps, Osborne, Dyer, & Ball, 2008; Talbert, Vaughn, Croom, & Lee, 2007). As a further illustration, one of the eight types of SAEs is research and experimentation (Roberts and Harlin, 2007). Conducting experiments by following the scientific method reinforces agricultural education standards and science standards. Students select areas of interest to gain hands-on experience in Agriscience. What is more, SAEs provide autonomous opportunities for students to extend their knowledge in particular areas of Agriculture (Croom, 2008). Therefore, it is reasonable to assume that there may be some relationship between student involvement in the FFA and with SAEs to their achievement on standardized exams in science.

Review of Literature

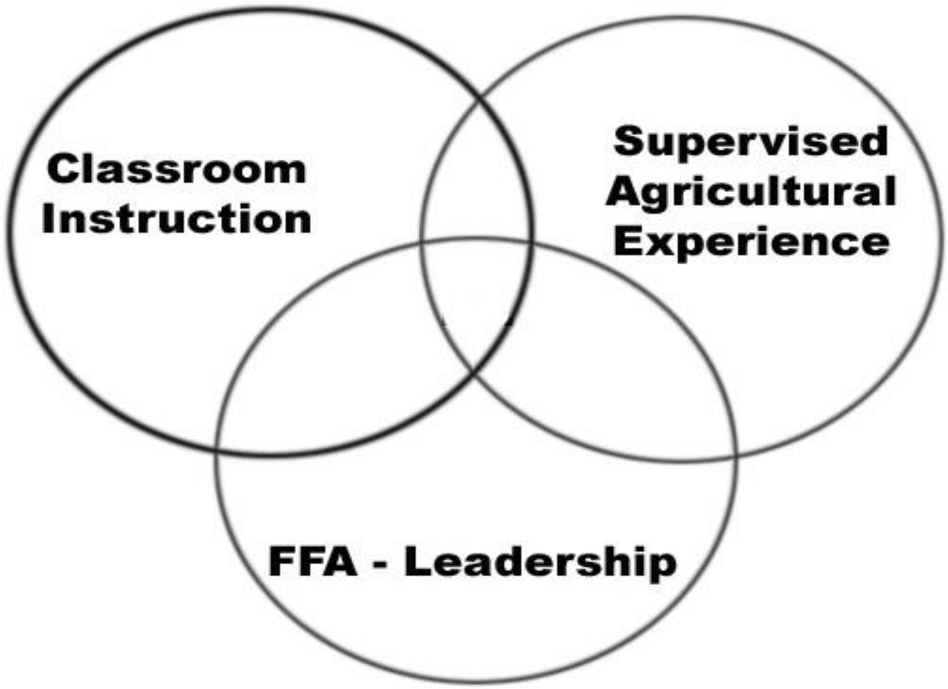
Ricketts, Duncan, and Peake (2006) researched Georgia schools with complete agricultural education programs as identified by instructional classrooms and laboratories, FFA activities, and SAE programs. The instrumentation included scores on Georgia High School Graduation Test (GHSGT) science section, passing rate on the first attempt, number of agricultural education courses passed, and teachers ranked engagement level in FFA and SAE programs. The data were analyzed using descriptive statistics of means, standard deviations, percentages, and frequencies. Inferential statistics were used to verify if agricultural education courses were related to student achievement in science. The relevant conclusions were that students attained higher (GHSGT) science scores because of involvement in agricultural education classes, FFA activities, and SAE programs. Further, the first time passing rate of agricultural education students was twice as high as career preparatory students. Also, agricultural education classes and FFA involvement were related to scientific comprehension and application.

It is widely accepted in agricultural education literature that an integral part of classroom instruction is SAE involvement. SAE offers students opportunities to practice informal learning outside of the classroom at school laboratories, job placements, and students' homes. Applying academic and agricultural theories learned through classroom instruction allowed opportunities for students to research and implement ideas that they wished to pursue (Roberts and Harlin, 2007). As previously mentioned, the study by McLure and McLure (2000) found that ACT Science scores improved as the number of outside classroom science activities increased. The study listed outside classroom activities as: created independent scientific research paper, performed independent scientific experiments, participated in science foundation summer camp, received recognition for scientific experiment, and participated in school, regional or state scientific contest. The study found that with each additional activity completed, the ACT Science scores increased.

To examine the foundations of SAE, Roberts and Harlin (2007) researched the philosophical and historical origins of the project method or SAE. The review of literature focused on project purposes, classifications, processes, settings, individual or groups, and the teachers' roles within each category. The authors concluded that modern SAEs have evolved from attaining expertise with agriculture skills to include preparation for non-agriculture careers with employability skills and that SAEs are utilized for experiential learning. Further, Shelley-Tolbert, Conroy, and Dailey (2000), concluded that experiential learning through SAEs and leadership opportunities through FFA activities must remain in science oriented agricultural education in order for students to transfer academic knowledge to real world applications.

Conceptual/Theoretical Framework

Agricultural education contains three equal segments: classroom/laboratory instruction, FFA, and SAE. Classroom/ laboratory instruction occurs during the school day where instruction is provided in the following areas in Georgia secondary public schools: Agribusiness Management, Agricultural Mechanics, Agriscience, Animal Science, Plant Science/Horticulture, Forestry/ Natural Resources, and Veterinary Science (Georgia State Department of Education, 2011). In response to connecting agriculture curriculum to academic subjects, in 2007, the Georgia Department of Education Agricultural Education Department implemented Georgia Performance Standards for agricultural education courses and cross referenced science, social studies, English, and mathematics standards that were associated with each agricultural education standard (Georgia Department of Education, 2011).



National FFA (2011)

With the aforementioned connections to science achievement with agriscience education, it would seem logical that there may be a relationship between the level of involvement a student holds in the FFA and with their SAE and their performance on a standardized exam of science knowledge.

This study was developed to help meet the goals of the National research agenda for Agricultural Education. According to Doerfert, a “key outcome” identified by the agenda included “Accurate and reliable data that describe the quality and impact of educational programs and outreach efforts at all levels [that] will be distributed to respective decision groups (e.g. students, parents, administration, industry, policy makers)” (p. 24) . This research represents an attempt to fulfill this aspect of the agenda.

Purposes and Objectives

The purposes of this study were to describe the science achievement of secondary agricultural education students both regular education and special education to determine if FFA and SAE participation held a relationship with students’ performance on science achievement when compared to students who did not participate in FFA and SAE.

1. Describe the relationship between FFA involvement and science achievement of regular education and special education agricultural education students.
2. Describe the relationship between SAE participation and science achievement of regular education and special education agricultural education students.

Methodology

The research design of this quantitative study was descriptive, correlational, and assessed group differences. The treatment group was the group of students who were in the eleventh grade during the academic year 2009-2010, had passed at least one secondary agricultural education course, and whose agricultural education instructors responded to the request by Georgia's State Director of Agricultural Education. The treatment group was subdivided into two groups based on number of agricultural education courses passed. The students that passed one or more secondary agricultural education course were labeled as participants and the students that passed three or more secondary agricultural education courses were labeled as concentrators (Georgia Department of Education, 2010).

To determine if students were agricultural education participants or agricultural education concentrators, agricultural education instructors listed the total number of secondary agricultural education courses passed. The instructors were asked to assist school counselors, testing coordinators or assistant principals in gathering information about number of agricultural education courses passed and recorded information on the chart provided. From this information, the researcher used *Predictive Analytical SoftWare (PASW) 18.0* computer software program to categorize students into agricultural education participant or agricultural education concentrator.

To determine the GHSGT science scores and student classification (special education participant or not), agricultural education instructors listed the GHSGT scores and classification for each agricultural education student. The instructors were asked to assist school counselors, testing coordinators, or assistant principals in gathering information about the GHSGT science scores to record on the information chart.

In addition to the GHSGT science scores, SAE and FFA rating scales were used to determine the intensity level of SAE and FFA involvement for the agricultural education students in the study. The rating scales were completed by the agricultural education instructors concerning the students' participation levels. The following guidelines were issued for the SAE participation level on a scale from one to five. A student with 10 or less hours per semester was a level one, 11 to 20 hours per semester was a level two, 21 to 30 hours per semester was a level three, 31 to 40 hours per semester was a level four, and a student that works 50 or more hours per semester on an SAE was a level five.

Along with the SAE ranking, agricultural education teachers rated students' FFA participation on a scale of one to five by following these guidelines. A student that participates in one FFA activity per semester was a level one, two activities per semester was a level two, three FFA activities per semester was a level three, four activities per semester was a level four, and five or more activities per semester was a level five. The following examples of FFA activities were listed to further guide the agricultural education instructors: chapter meetings, officer meetings, CDEs, leadership camps, and livestock competitions.

The dependent variable was the student scores on the science portion of the GHSGT taken spring 2010. The independent variables were SAE involvement, FFA participation, and special education status of eleventh grade agricultural education students that completed the science portion of the 2009-2010 GHSGT.

In addition to statistical significance analysis, effect size was calculated. According to Kotrlik, Williams, and Jabor (2011), Cohen *d* was calculated to estimate effect size on *t* tests and compared to the following values: .20 small effect size, .50 medium effect size, and .80 large effect size. Just as Cohen *d* was calculated to determine effect size for *t* tests, *Eta-squared* was calculated to estimate effect size for ANOVA and compared to the following values: .10 small effect size, .25 medium effect size, and .40 large effect size (Kotrlik, Williams, & Jabor, 2011).

Findings

The percentage of concentrator regular education students with high FFA involvement in each GHSGT science score category was: below proficiency 3%, basic proficiency 39%, advanced proficiency 44%, and honors 14% (Table 1).

Table 1
Descriptive Statistics for GHSGT Science Exam Scores of Regular Education and FFA Levels of Overall Agricultural Education Students (n=3,665), Agricultural Education Participants (n=2,345), and Concentrators (n=1,320)

GHSGT Category	Overall and Low FFA Level Percentage	Overall and High FFA Level Percentage	Participant and Low FFA Level Percentage	Participant and High FFA Level Percentage	Concentrator and Low FFA Level Percentage	Concentrator and High FFA Level Percentage
Below	02	03	02	03	02	03
Basic	41	42	43	43	39	39
Advanced	45	42	43	41	46	44
Honors	12	13	12	13	13	14
n	2740	925	1745	600	995	325
M	240	239	239	238	241	240

The percentage of concentrator special education students with high FFA involvement in each GHSGT science score category was: below proficiency 22%, basic proficiency 60%, advanced proficiency 16%, and honors 2% (Table 2).

Table 2

Descriptive Statistics for GHSGT Science Exam Scores of Special Education and FFA Levels of Overall Agricultural Education Students (n=556), Agricultural Education Participants (n=347), and Concentrators (n=209)

Category	Overall and Low FFA Level Percentage	Overall and High FFA Level Percentage	Participant and Low FFA Level Percentage	Participant and High FFA Level Percentage	Concentrator and Low FFA Level Percentage	Concentrator and High FFA Level Percentage
Below	21	21	23	22	18	22
Basic	58	53	58	57	59	60
Advanced	17	22	17	19	17	16
Honors	04	04	02	02	06	02
n	407	149	249	98	158	51
M	213	223	212	223	216	227

In addition to FFA involvement, SAE activities were examined. The agricultural education instructors ranked the students' intensity levels on a scale of one to five using the following guidelines. A student with 10 or less hours per semester was a level one, 11 to 20 hours per semester was a level two, 21 to 30 hours per semester was a level three, 31 to 40 hours per semester was a level four, and a student that works 50 or more hours per semester on an SAE was a level five. These rankings were compiled into two categories: participants and concentrators.

The percentage of concentrator regular education students with high SAE intensity in each GHSGT science score category was: below proficiency 2%, basic proficiency 38%, advanced proficiency 46%, and honors 14% (Table 3).

Table 3

Descriptive Statistics for GHSGT Science Exam Scores of Regular Education and SAE Levels of Overall Agricultural Education Students (n=3,665), Agricultural Education Participants (n=2,345), and Concentrators (n=1,320)

GHSGT Category	Overall and Low SAE Level Percentage	Overall and High SAE Level Percentage	Participant and Low SAE Level Percentage	Participant and High SAE Level Percentage	Concentrator and Low SAE Level Percentage	Concentrator and High SAE Level Percentage
Below	02	02	02	03	02	02
Basic	42	41	42	42	39	38
Advanced	43	45	43	43	46	46
Honors	13	12	13	12	13	14
n	2149	1516	1392	953	757	563
M	239	240	239	239	240	241

A total of 556 students were special education students with 298 (54%) classified as low SAE intensity with a GHSGT science mean score of 224. The percentage of special education students in each GHSGT science score category was: below proficiency 20%, basic proficiency 56%, advanced proficiency 18%, and honors 6%. The percentage of concentrator special education students with high SAE intensity in each GHSGT science score category was: below proficiency 22%, basic proficiency 59%, advanced proficiency 18%, and honors 0.9% (Table 4).

Table 4
Descriptive Statistics for GHSGT Science Exam Scores of Special Education and SAE Levels of Overall Agricultural Education Students (n=556), Agricultural Education Participants (n=347), and Concentrators (n=209)

GHSGT Category	Overall and Low SAE Level Percentage	Overall and High SAE Level Percentage	Participant and Low SAE Level Percentage	Participant and High SAE Level Percentage	Concentrator and Low SAE Level Percentage	Concentrator and High SAE Level Percentage
Below	20	22	21	22	16	22
Basic	56	58	56	57	59	59
Advanced	18	18	19	19	15	18
Honors	06	02	04	02	10	.9
n	298	258	198	149	102	107
M	224	213	222	213	230	212

To further analyze the descriptive information, SAE rankings and FFA rankings were explored for all regular education agricultural education. For all regular education students, 2,149 students had a low SAE ranking with 1,953 (91%) with a low FFA ranking with a GHSGT science mean score of 239.33 and 196 (9%) had a low SAE ranking with a high FFA ranking with a GHSGT science mean score of 239.87. The 1,516 regular education students with high SAE level, 787 (52%) had a high SAE ranking with low FFA ranking with a GHSGT science mean score of 240.50 and 729 (48%) had a high SAE ranking and high FFA ranking with a GHSGT science mean score of 238.47.

Concentrator special education students had the following descriptive SAE and FFA information. For concentrators, 102 students had a low SAE ranking with 98 (96%) with a low FFA ranking with a GHSGT science mean score of 218 and 4 (4%) had a low SAE ranking with a high FFA ranking with a GHSGT science mean score of 244. The 107 special education participants with high SAE level, 60 (56%) had a high SAE ranking with low FFA ranking with a GHSGT science mean score of 214 and 47 (44%) had a high SAE ranking and high FFA ranking with a GHSGT science mean score of 211 (Table 5).

Table 5

GHSGT Science Exam Scores of Regular and Special Education with SAE and FFA Levels of Overall Agricultural Education Students, Agricultural Education Participants and Agricultural Education Concentrators

Category	*n*	M	SD
Overall Regular Education	3665		
Low SAE Level and Low FFA Level	1953	239.33	28.28
Low SAE Level and High FFA Level	196	239.87	28.43
High SAE Level and Low FFA Level	787	240.50	26.40
High SAE Level and High FFA Level	729	238.47	27.71
Participant Regular Education	2345		
Low SAE Level and Low FFA Level	1237	238.59	28.68
Low SAE Level and High FFA Level	155	240.59	28.03
High SAE Level and Low FFA Level	508	239.96	26.82
High SAE Level and High FFA Level	445	237.22	26.83
Concentrator Regular Education	1320		
Low SAE Level and Low FFA Level	716	240.61	27.55
Low SAE Level and High FFA Level	41	237.12	30.10
High SAE Level and Low FFA Level	279	241.48	25.63
High SAE Level and High FFA Level	284	240.43	28.93
Overall Special Education	556		
Low SAE Level and Low FFA Level	271	215.12	26.05
Low SAE Level and High FFA Level	29	232.76	31.06
High SAE Level and Low FFA Level	136	212.54	22.07
High SAE Level and High FFA Level	120	213.88	25.49
Participant Special Education	347		
Low SAE Level and Low FFA Level	173	213.28	25.27
Low SAE Level and High FFA Level	25	231.04	29.99
High SAE Level and Low FFA Level	76	211.26	21.77
High SAE Level and High FFA Level	73	215.95	28.57
Concentrator Special Education	209		
Low SAE Level and Low FFA Level	98	218.36	27.19
Low SAE Level and High FFA Level	4	243.50	40.34
High SAE Level and Low FFA Level	60	214.17	22.53
High SAE Level and High FFA Level	47	210.66	19.65

Selected Relationships between Study's Participants and GHSGT Science Exam

Table 6

Relationship Between GHSGT Science Exam Scores of All Regular Education Agricultural Education Students (n=3,665), Number of Agricultural Education Courses Passed, FFA Participation, and SAE Activities.

Variable	Y_1	X_1	X_2	*M*	SD
GHSGT Science Score (Y_1)	1.000	-.014	.003	239.43	27.77
FFA (X_1)		1.000	.442**	1.25	.43
SAE (X_2)			1.000	1.41	.49

*p < .05, **p < .001

Students with FFA activities level of 1 (N=1,153) had a GHSGT science mean score of 237.56 with a standard deviation of 28.06. Students with FFA activities level of 2 (N=1,813) had a GHSGT science mean score of 236.38 with a standard deviation of 29.77. An ANOVA test did not reflect a statistically significant difference between the groups ($F_{(1, 1528)} = .481$, $p = .488$) at a *priori* alpha level of .05 (Table 7).

Table 7

GHSGT Science Exam Scores of Concentrators (n=1,529) and FFA Levels

Student Category	n	M	SD	*p*-value
Concentrator Low FFA Level	1153	237.56	28.06	
Concentrator High FFA Level	376	236.38	29.77	
Between Groups				.488

Calculating the effect size was not necessary due to lack of statistical significance. A point-biserial correlation test between FFA activities and GHSGT science achievement revealed a negative, "low" and no statistically significant relationship, ($\rho_{bi} = -.018$, $p = .244$) for regular education and special education agricultural education concentrators. As a result, the null hypothesis ($H_0 2$) was not rejected; therefore, the FFA activity level of agricultural education students did not have a statistically significant relationship with science achievement on the GHSGT (Table 8).

Table 8

Relationship Between Regular Education, Special Education Agricultural Education Concentrators (n=1,529), FFA Participation, and SAE Activities.

Variable	X_2	X_3	*M*	SD
FFA (X_2)	1.000	.509**	1.43	.50
SAE (X_3)		1.000	1.24	.43

**p < .001

Students with SAE activities level of 1 (N=859) had a GHSGT science mean score of 237.92 with a standard deviation of 28.53. Students with SAE activities level of 2 (N=670) had a GHSGT science mean score of 236.43 with a standard deviation of 28.42. An ANOVA test did not reflect a statistically significant difference between the groups ($F_{(1, 1528)} = 1.037$, $p = .309$) at a *priori* alpha level of .05 (Table 9).

Table 9
GHSGT Science Exam Scores of Concentrators (n=1,529) and SAE Levels

Student Category	n	M	SD	*p*-value
Concentrator Low SAE Level	859	237.92	28.53	
Concentrator High SAE Level	670	236.43	28.42	
Between Groups				.309

Calculating the effect size was not necessary due to lack of statistical significance. A point-biserial correlation test between SAE participation and GHSGT science achievement revealed a negative, “low” and no statistically significant relationship, ($\rho_{bi} = -.026$, $p = .154$) for regular education and special education agricultural education concentrators. Therefore, the SAE activity level of agricultural education students did not have a statistically significant relationship with science achievement on the GHSGT (Table 10).

Table 10
Relationship Between GHSGT Science Exam Scores of Regular Education and Special Education Agricultural Education Concentrators (n=1,529), FFA Participation, and SAE Activities.

Variable	Y_1	X_1	X_2	*M*	SD
GHSGT Science Score (Y_1)	1.000	-.026	-.018	237.27	28.48
FFA (X_1)		1.000	.509**	1.43	.50
SAE (X_2)			1.000	1.24	.43

**p < .001

Conclusions and Recommendations

Within the treatment groups, FFA involvement and SAE intensity levels varied between regular/special education status, and number of agricultural education courses passed. A total of 2,345 students were participant regular education students with 1,745 (74%) classified as low FFA participation. High FFA levels from participant regular education students were 600 (26%). A total of 1,320 students were concentrator regular education students with 995 (75%) classified as low FFA participation. The number of concentrator regular education students with high FFA participation was 325 (25%).

A total of 347 students were participant special education students with 249 (72%) classified as low FFA participation. Participant special education students accounted for 98 (28%) classified as high FFA participation. A total of 209 students were concentrator special education students with 158 (76%) classified as low FFA participation. Concentrator special education with high FFA participation numbered 51 (24%).

A total of 2,345 students were participant regular education students with 1,392 (59%) classified as low SAE levels. High SAE levels for participant regular education totaled 953 (41%). A total of 1.320 students were concentrator regular education students with 757 (57%) classified as low SAE participation. High SAE participation by concentrator regular education students numbered 563 (43%).

A total of 347 students were participant special education students with 198 (57%) classified as low SAE participation. High SAE participation level contained 149 (43%). A total of 209 students were concentrator special education students with 102 (49%) classified as low SAE participation. High SAE levels by participant special education students numbered 107 (51%).

Regular education and special education agricultural education concentrators with low FFA activities level (N=1,153) had a GHSGT science mean score of 237.56 and regular education and special education agricultural education concentrators with high FFA activities level (N=376) had a GHSGT science mean score of 236.38. An ANOVA test was performed between the two groups and was not statistically significant ($F_{(1, 1528)} = .481$, $p = .488$) at a *priori* alpha level of .05. A point-biserial correlation test between FFA activities and GHSGT science achievement revealed a negative, "low" and no statistically significant relationship, ($\rho_{bi} = -.018$, $p = .244$) for regular education and special education agricultural education concentrators. Therefore, the FFA activity level of regular education and special education agricultural education concentrators did not have a statistically significant relationship with science achievement on the GHSGT. These findings did not parallel the results of a similar study conducted by Alfeld, Stone III, Aragon, Hansen, Zirkle, Conners, Spindler, Romine, and Woo (2007) which concluded that academic engagement of students increased as CTSO participation increased.

Regular education and special education agricultural education concentrators with low SAE activities level (N=859) had a GHSGT science mean score of 237.92 and regular education and special education agricultural education concentrators with high SAE activities level (N=670) had a GHSGT science mean score of 236.43. An ANOVA test was performed between the two groups and was not statistically significant ($F_{(1, 1528)} = 1.037$, $p = .309$) at a *priori* alpha level of .05. A point-biserial correlation test between SAE participation and GHSGT science achievement revealed a negative, "low" and no statistically significant relationship, ($\rho_{bi} = -.026$, $p = .154$) for regular education and special education agricultural education concentrators. Therefore, the SAE activity level of regular education and special education agricultural education concentrators did not have a statistically significant relationship with science achievement on the GHSGT. These findings did not parallel the results of a similar study conducted by McLure and McLure (2000) which concluded that ACT Science scores increased as the number of outside classroom science activities increased.

Even though no statistically significant difference was indicated between FFA activities and SAE participation with academic achievement, additional studies with different designs are needed to determine the relevance of these components of agricultural education. For example, research conducted with specific CDE participants and end of course tests (EOCT) for academic subjects such as the nursery/landscape CDE participants and biology EOCTs. To research the relationship between SAE and academic achievement, students must be tested for career readiness skills in math, science, and reading to determine if these agricultural education activities improved their competencies.

Even though the FFA and SAE data did not show statistical significance, these components were integral parts of agricultural education programs that reiterated classroom concepts to improve academic performance (Phipps, Osborne, Dyer, & Ball, 2008). Experiential learning and informal learning allowed students relevant opportunities to practice critical thinking skills (Roberts & Harlin, 2007; Shelley-Tolbert, Conroy, & Dailey, 2000, Conroy & Walker, 2000). Youth organizations provided motivation for students to excel by linking course standards to competitive events (Threeton & Pellock, 2010).

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Students' Perceptions Concerning International Educational Experiences

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Abstract

The desire for students to have an international education experience has become prevalent for many university faculty and administrators (Fischer, 2008). However, many students still graduate every year without some form of international experience (Kuh, 2007). The purpose of this descriptive study was to determine student perceptions concerning international educational experiences. A total of 316 participants provided responses that were analyzed and presented. A questionnaire was employed to explore contextual, social, and cultural phenomena. Within the population questioned, the vast majority (75%) held aspirations for achieving some level of international study before they finish their degree. However, an overwhelming majority (84%) had not studied abroad at the time of the study. Among the top motivational factors to study abroad, "Overall life experience" and "Opportunity to work in another country after completing my current degree" topped the list. When choosing an international study experience, respondents indicated that the "Weather conditions/climate" was the most important factor, followed by "The country itself" when evaluating factors that would impact their decision. The majority of participants agreed that an international study experience would improve their competitiveness in a global marketplace. This study highlights the need to provide high quality study abroad experiences at the most economically efficient rate. Findings of this research provide a better understanding of student aspirations, motivations, expectations, and barriers to international study. The findings from this study may be helpful in providing instructors and administrators with an insight that will equip them to assist students in overcoming barriers associated with international experiences.

Introduction

Many researchers have contemplated the value of the study abroad experience. (Acker & Scanes, 2000; Andreasen & Wu, 1999; Ivey, 2005; Kuh, 2007; Teague, 2005). Goucher College president, Sanford J. Ungar stated, “No number of cross-cultural reading assignments or trips to the museum or lectures by wise and wonderful people has the same effect on young people as a study-abroad experience, even a brief one” (Fischer, 2008 p.1). To further illustrate this phenomenon, the current trend at Auburn University is to increase the number of students who study abroad as a part of their academic experience. Kuh (2007) concluded that study abroad is an “educationally enriching and potentially life changing experience” (p.17). Further, Kuh noted that students who study abroad often “expand their perspective on world affairs, better comprehend diverse cultures and languages, and grow in self-understanding” (p.17). Therefore, a better understanding of the student perspective of international study is imperative.

The development and implementation of international education incentives have been a focus in higher education in the United States for several decades (Cater, 1992). As the international community moves toward interdependence there is an increasing need for the international competence of American students. Consequently, it is important to recognize the role of the university in helping students acquire skills that will serve them best in an interconnected world (Hutchins, 1996).

While previous studies have been conducted to attempt to determine the perceptions and aspirations of current agriculture and education students towards international studies (Andeasen, 2003; Place, Irani, and Friedel, 2006), further research was warranted based on the strategic plan developed for Auburn College of Agriculture concerning the desire for students to have an international experience and the low number of students who choose to study internationally at Auburn.

Before we can effectively assess the student’s interest and willingness to become involved in international education experiences, the characteristics, features and predispositions that shape perceptions must be analyzed. A defining characteristic of today’s university students is the propensity to construct knowledge from experiences, which is a form of social constructivism that shapes and molds the learner as an individual that is motivated, self-confident, and independent, yet collaborative (Thomas, 2009). Today’s students are influenced by such factors as migration-immigration, climate change, population growth, and global economics, along with the impact of technology (Catlett, 2007). Technological advances in communication bring world happenings to our own daily life. The number and scope of international interactions compounds daily. Akpan & Martin (1996) believed that with the rapid shrinking of our world, U.S. institutions cannot afford not to prepare her citizens for participation in world affairs (Reed, 1985).

The U.S. Department of Education (2000) outlined the importance of international education as to support the development of international awareness and to insure that all internationalization efforts in education were documented, measured, and reported. Findings of this research provide a better understanding of student aspirations, motivations, expectations, and barriers to international study. These findings will contribute to guiding policies and procedures for the development and implementation of international experiences for students. The findings of this study uncover barriers for students in obtaining an international experience that may provide instructors and administrators with an insight that will equip them to assist students in overcoming these barriers.

Purpose and Research Questions

The purpose of this study was to determine student perceptions concerning international educational experiences. To accomplish this purpose, the following research questions guided the study:

(1) What were selected characteristics of students enrolled in the colleges of agriculture and education at Auburn University?
(2) What were reasons why students choose to study abroad?
(3) What were the decision criteria when considering a study abroad experience?
(4) What were students' future plans concerning international study?
(5) Could a predictive model be established to predict students' desires to study abroad based on multiple variables?

Methods

Participants

This study was descriptive and correlational in design. A total of 316 participants provided responses that were analyzed and presented as data for this study. Participants were solicited from both the College of Education and the College of Agriculture at Auburn University. Participants included undergraduate and graduate students. These students were selected based on their enrollment in an agriculture class that held a relatively large enrollment. The participants were not chosen from any courses that related directly to international studies to reduce bias among participants.

Measures

The questionnaire used to collect the data was developed by a team of researchers and evaluated by a panel of experts to establish content validity. The instrument was based on a previous instrument used to compare international study aspirations of students from Armenia and other European students (Shinn, Briers, Navarro, Peake, Duncan, Parr, & Galoyan, 2008; Shinn, Briers, Navarro, Peake, Parr, Ter-Mkrtchyan, & Duncan, 2009). The survey instrument was designed to explore contextual, social, and cultural phenomena. The two scales in the instruments representing the motivation to study abroad and importance of factors to consider when studying abroad yielded reliability coefficients (Cronbach's alpha) of .770 and .767 respectively. The instrument was also employed to attempt to identify a model to predict group membership via binary logistic regression. To meet the requirements of logistic regression, the dependent variable must be dichotomous. The dependent variable in this case was the student's consideration of study abroad opportunities i.e. the student would consider studying abroad or would not consider studying abroad. The independent variables included in this prediction model included; number of years the participant had lived outside of Alabama, number of years they had lived outside of the U.S., age, current grade point average, the degree they were seeking (undergraduate or graduate), their opinion of a study abroad experience impact on their global competitiveness for employment, previous participation in study abroad, and their gender. Descriptive statistics including frequencies, means, and standard deviations were calculated for all items on the instrument.

Procedures

The researchers contacted the department heads of each of the departments within the colleges to request permission to contact faculty concerning administering the questionnaire to their classes. Next, instructors were contacted that taught the largest class sections within their respective disciplines so that the maximum number of students could participate with representation from each of the departments in the college of agriculture and the college of education. This sample was a purposive sample that was not chosen randomly, therefore, no generalization may be made to other populations than the one studied. The researcher administered the questionnaire after the course instructor had left the room to guard against coercion. The Auburn University Institutional Review Board approved the protocol for data collection in this study. After the data were collected, they were entered into SPSS 19 and analyzed.

Findings

The responding sample comprised 316 students. Undergraduate student respondents totaled 285; graduate student respondents totaled 22. When questioned concerning gender, 50.3 percent of the respondents indicated that they were male while 48.7 percent were female. Nine point two percent were 19 or younger, while 80 percent were 21 years old. The majority of students had lived only in the state of Alabama and held a grade point average of at least 3.0.

Table 1.
*Demographics of Student Respondents, N=316**

		f	%
Gender	Male	159	50.3
	Female	154	48.7
Age	19 or younger	29	9.2
	20	69	21.8
	21	80	25.3
	22	57	18
	23	31	9.8
	24-29	39	12.3
	30 and older	7	2.2
Degree Level	Undergraduate	285	92.8
	Graduate	22	7.1
Grade point average	4.0	10	3.2
	3.99-3.50	57	18
	3.49-3.00	120	38
	2.99-2.5	77	29.4

	2.49- 2.00	36	11.4
Residences	Only in Alabama	186	58.9
	Lived outside AL 1 year or more	130	41.1
	Lived only in US only	288	91.1
	Lived outside of the U.S. 1 year or more	28	8.9

*Frequencies may not total 316 because of missing data.

To accomplish the purpose of this research study, respondents were first questioned concerning their desire to study abroad. An overwhelming majority (75%) indicated that they would consider a study abroad experience. (Table 2)

Table 2.
Interests and Preferences of Participants in International Education Experience, N=316

Would you consider studying abroad?	F	%
I would consider an International experience.	237	75
No, I do not want to study abroad.	79	25

Participants were also questioned concerning their previous study abroad experience. Only thirty four respondents (10.8%) had done so. However, of those who had studied abroad, over 91% reported that they were very satisfied with their experience.

Students were given the opportunity to rate 10 factors that were identified from the literature concerning the level of motivation each factor provided them in their decision to study abroad. The descriptors for the ratings included; "Does not Motivate" (1), "Motivates a Little" (2), "Motivates" (3), and "Motivates a Lot" (4). See table 3. Students were most motivated by "Overall life experience" and "Opportunity to work in another country after completing my current degree".

Table 3.
Students' Rating of Selected Factors That May Motivate Them to Study Abroad

Factor	1 Does not motivate f	2 Motivates a little f	3 Motivates f	4 Motivates a lot f	M S.D.
Increased Employability	22	39	64	92	3.0 1.06
Opportunity to live in another country or culture	62	55	53	47	2.36 1.14
Learn another language	38	78	62	41	2.47 1.00

Opportunity to work in another country after completing my current degree	16	21	57	124	3.30 .97
Important stage in my personal development	20	56	72	71	2.87 .98
Overall life experience	8	14	50	148	3.53 .77
Learn more about my academic specialization	17	56	86	59	2.84 .93
Get a graduate degree	36	57	82	42	2.57 1.01
Looks good on a resume	29	41	84	64	2.83 1.01
Importance placed by academic advisor/department	70	70	51	24	2.13 1.00

Fourteen factors from previous literature were presented to students and they were asked to rate them in terms of their importance when considering studying abroad. The descriptors for each of the 14 factors included the following; “Not Important” (1), “Somewhat Important” (2), Important” (3), or “Very Important” (4). See table 4. “Weather conditions/climate” was the most important factor, followed by “The country itself” and “The subject matter specialty of the program”.

Table 4.
Students' Ratings of Importance of Selected Factors as They Consider Study Abroad Options

Factor	1 Not Important	2 Somewhat Important	3 Important	4 Very Important	Mean SD
	f	f	f	f	
The country itself	1	19	64	137	3.49 .75
The language spoken in the country and/or the university	9	43	89	79	3.04 .91
For U.S. study abroad programs, the reputation of the foreign university	15	40	101	67	2.99 .87
For study in foreign universities, the reputation of the foreign university	11	43	94	74	3.04 .85
For AU programs, the reputation of the specific program	11	39	103	69	3.04 .83

The subject matter specialty of the program	4	20	73	125	3.44 .73
Having friends accompany me on the study abroad (for U.S. study abroad programs)	37	69	62	54	2.60 1.03
Information available about the country, university, program	61	64	64	31	2.27 1.04
Accessibility to and from the U.S.	96	80	28	18	1.86 .93
Affordability	4	38	97	82	3.14 .80
Cultural attractions in the area	17	54	66	83	2.95 1.00
Weather conditions/climate	4	17	44	157	3.59 .71
Having friends who study at that university (for study in foreign universities)	9	42	97	72	3.03 .87
Having friends and family in the area or region	29	61	90	42	2.65 .93

Participants were asked to indicate their belief concerning their perception of the value of participation in a study abroad program especially as it related to improving their competitive advantage in a global market place. Two hundred seventeen participants (68.7%) responded positively that study abroad would improve their competitiveness, 17 were neutral or unsure while 78 (24.7%) said they did not believe it would increase their competitiveness.

Finally, relationships between selected student characteristics were examined as well as the development of a model to predict group membership between students who did desire to study abroad and those who did not.

There was a statistically significant relationship between students' desire to study abroad and their perception concerning the effect that studying abroad would have on their competitiveness in the global market place. Pearson's Correlation Coefficient = .20

The relationship between gender and desire to study abroad was examined. Females were more likely to desire to study abroad than were males. Pearson's Correlation Coefficient = .16

The relationship between grade point average (GPA) and study abroad was examined and revealed that there was a statistically significant positive relationship between participants' desire to study abroad and their current GPA. Pearson's Correlation Coefficient = .12

The relationship between type of degree sought, year of study and desire to study abroad was also examined but no statistically significant relationships were detected.

Finally, all of the aforementioned factors were employed to develop a model of prediction concerning group membership in a desire to study abroad or in no desire to study abroad. Logistic regression was employed to develop this model. The investigation of this model did reveal that three factors; years the student had lived outside of Alabama, their opinion concerning the value of study abroad toward their global competitiveness, and previous participation in a study abroad experience, did provide a statistically significant contributions to predicting the students' desire to study abroad. However, the model only accounted for a little over 11% of the variance, therefore it is not a very accurate predictor of group membership in the vast majority of cases. See table 5.

Table 5.
Analysis of Selected Variables That Contribute to a Prediction Model for Students' Desire to Study Abroad

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Years lived out AL	-.043	.020	4.897	1	.027	.958
	Years lived out US	.000	.043	.000	1	.995	1.000
	Age	-.056	.044	1.601	1	.206	.946
	GPA	.038	.164	.052	1	.819	1.038
	Degree sought	.118	.380	.097	1	.755	1.126
	Year in degree	-.005	.144	.001	1	.971	.995
	Global comp	.372	.107	12.127	1	.000	1.450
	Previous partic.	.770	.363	4.494	1	.034	2.161
	Gender	-.269	.310	.755	1	.385	.764
	Constant	107.341	88.223	1.480	1	.224	4.147E46

Table 6.
Variance Accounted for by Prediction Model

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	290.212[a]	.113	.166

Conclusions

It is important to recognize that the participants in this study were not chosen randomly from a population; therefore, no generalizations may be drawn. However, this research exposed several facets of a phenomenon that may warrant investigation in other populations. Within the sample questioned, the vast majority (75%) held aspirations for achieving some level of international study before they finish their degree. However, an overwhelming majority (87%) had not studied abroad at the time of the study. There were several motivational factors that were observed within this group that influenced their decisions to seek international study experiences. Among the top factors were, “Overall life experience” and “Opportunity to work in another country after completing my current degree”. When choosing an international study experience, respondents indicated that the “Weather conditions/climate” and “The country itself” would highly impact their decision. The majority of participants (74.1%) agreed that an international study experience would improve their competitiveness in a global marketplace. The predictive model tested in this study did not prove to be a very useful model.

Discussion, Implications, and Recommendations

The findings from this study concerning the participants’ great interest in study abroad opportunities were congruent with previous research (Briers, Shinn, & Nguyn, 2010; Place, Irani, & Friedel, 2004). Further, as in previous research (Briers, Shinn, & Nguyn, 2010), it was revealed that most students had not taken advantage of opportunities to study abroad. The participants recognized the value of an international experience to their career goals. These findings would seem to indicate that students have become aware of the global nature of many careers and feel the need to participate in experiences that could better prepare them to be more internationally minded. This research has revealed that the country that study abroad experiences are offered in and the specialty area of the international institution are very important to students when considering where they will study abroad. Therefore efforts should be made to determine which countries and subject matter areas would draw the most participation in study abroad programs so that the maximum number of students may be served. The responses indicate that cost is a major factor in the decision process. The need to design economical study experiences is most important. No longer can international experiences for students be handled as tourist experiences that include expensive hotel stays and are thus limited to the wealthiest of students. This study highlights the need to pursue high quality study abroad experiences at the most economically efficient rate.

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Evaluating Change in Undergraduate Attitudes: Capturing Impacts of Faculty Travel Abroad Experiences Shared through RLO Implementation

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Evaluating Change in Undergraduate Attitudes: Capturing Impacts of Faculty Travel Abroad Experiences Shared through RLO Implementation

Reusable learning objects (RLOs) are self-contained, digital learning activities ranging in length from 2 to 15 minutes. These units can either be used individually or linked together to create a larger unit to be delivered in class as part of a lecture, used as a case study or laboratory object, or hosted on either an eLearning platform or independent Web page. For this project, faculty participants each created an RLO that could be used in an undergraduate course to teach students subject-matter knowledge within the Ecuadorian context and integrated them into six undergraduate courses in the College of Agricultural and Life Sciences at the University of Florida over the course between Fall 2011 and Fall 2012. This study investigated whether undergraduate attitudes about a foreign country would be influenced by exposure to an RLO when that country was used as the context to present subject-matter knowledge. Using a one-group pretest-posttest design for each RLO implementation, the researchers sought to: (a) identify pre-existing undergraduate attitudes regarding Ecuador prior to RLO exposure; (b) identify undergraduate attitudes regarding Ecuador following RLO exposure; and (c) determine if undergraduate attitudes regarding Ecuador were significantly different before and after RLO exposure. Preliminary results of this study suggest that undergraduate attitudes about a foreign country may be influenced by exposure to an RLO when that country is used as the context to present subject-matter knowledge.

Introduction/Theoretical Framework

The discourse of internationalization continues to resound throughout the academic world – a call for graduates of higher educational institutions to be properly skilled in competencies that will allow them to live and work in a society no longer constrained within a singular custom or culture (NAFSA, 2008; NASULGC, 2007). With this increased engagement in such varied work environments, graduates should be prepared to interact within this dynamic diversity, displaying awareness of and aptitude for engaging in unfamiliar cultures, major global issues, and currents of change (American Council on Education, 2012; Brustein, 2007). This message has continued to reverberate through academia, found in a recent report from the American Council on Education (2011):

> It is the obligation of colleges and universities to prepare people for a globalized world, including developing the ability to compete economically, to operate effectively in other cultures and settings, to use knowledge to improve their own lives and their communities, and to better comprehend the realities of the contemporary world so that they can better meet their responsibilities as citizens. (p. 14)

The 2011-2015 National Research Agenda for the American Association for Agricultural Education (Doerfert, 2011) also echoed that message, specifically stating that agricultural programs:

> must be able to better understand the models, strategies, and tactics needed to best prepare, promote, and retain new professionals who demonstrate the requisite

> content knowledge, technical competence, and cultural awareness, coupled with communication and interpersonal skills. (p. 20)

Furthermore, professionals that emerge from these agricultural programs must be prepared to understand and relate within the ever-evolving global nature of agricultural enterprise (National Academy of Science, 2009). They must be equipped to address the complex international issues developing within once static practices of agriculture. These points reflect not only a dialogue among university administrators and professional societies, but also one being recognized by students themselves. In a study by the American Council of Education, over 50% of students surveyed reported believing that having knowledge of international issues would be important for their personal careers (Lumkes, Hallett, & Vallade, 2012).

In response, universities have attempted to internationalize the undergraduate curriculum by incorporating strategies such as study abroad opportunities, exchange programs, and globally-focused courses in order to provide students with the intercultural skills necessary to achieve increased undergraduate internationalization (Institute of International Education [IIE], 2009). Participation of U.S. undergraduates in study abroad opportunities has more than doubled over the past decade, but this number represents only a small percentage of the overall American student population (Institute of International Education, 2010). Research attempting to predict undergraduate participation in study abroad activities reveals not only the importance of perceived career benefits (Relyea, Cocchiara, & Studdard, 2008), but also of pre-existing intercultural attitudes (Kim & Goldstein, 2005). One example of an intercultural attitude from current research is ethnocentrism, which has been identified as "one of the central concepts in understanding outgroup attitudes and intergroup relations" (Neuliep & McCroskey, 1997, p. 385). Since it is possible for ethnocentrism to decrease intercultural communication competence while generating misperceptions about culturally different individuals (Gudykunst & Kim, 1997; Kim & Goldstein, 2005; Wiseman, Hammer, & Nishida, 1989), opportunities that assist participants in breaking down attitudinal barriers must be provided in order to elicit the greatest value from the international experiences.

The low number of students opting to include study abroad opportunities in their coursework means the university must rely on faculty members to provide the remaining students with enhanced exposure to international content (Russo & Osborne, 2004). A panel of professionals with extensive international experience concluded that undergraduates appear to greatly benefit when exposed to information presented by professionals who had worked for long periods of time in international settings and who integrated those corresponding cultural perspectives and contexts into their course material (Bruening & Shao, 2005). Within the university, teaching faculty are often best situated to present undergraduates with this information, but in order to do so faculty must be afforded opportunities to gain international experiences. Even when faculty members have international experiences, the question of whether such experiences are able to impact undergraduate intercultural attitudes remains unanswered.

One effort to increase the international experience of teaching faculty, and thus impact undergraduate intercultural attitudes, is present in the Teaching Locally, Engaging Globally [TLEG] Higher Education Challenge Grant project. Funded through a USDA Higher Education

Challenge Grant, the TLEG project provided teaching faculty from three southern U.S. land-grant universities with an opportunity to spend 10 – 12 days in Ecuador, Trinidad and Tobago, or Costa Rica observing their subject area within a different culture. This study focuses on outcomes resulting from the Ecuador trip.

One of the project's objectives focused on improving undergraduate attitudes regarding the Ecuadorian culture and global aspects of the respective discipline. Eight project faculty participants collected data, pictures, and videos while in Ecuador in order to create a reusable learning object (RLO) or case studies. RLOs are self-contained, digital learning activities ranging in length from 2 to 15 minutes that can either be used individually to supplement lecture materials or linked together to create a larger unit (Grunwald & Reddy, 2007; Neven & Duval, 2002). RLOs can be utilized in various ways such as delivered in class as part of a lecture, used as a case study or laboratory object, or hosted on either an eLearning platform or independent Web page (Grunwald & Reddy, 2007). For this project, faculty participants each created an RLO that could be used in an undergraduate course to teach students subject-matter knowledge within the Ecuadorian context. RLOs for the project were integrated into six undergraduate courses in the College of Agricultural and Life Sciences at the University of Florida over the course of the 2011-2012 academic year, and in Fall 2012. The manner that faculty participants chose to integrate the RLO into the classroom varied: several faculty members chose to simply present the RLO content as part of a PowerPoint presentation; another utilized an RLO on nutrition in Ecuador to present case study information to the students for testing critical thinking about previously-learned materials; still another professor used an RLO on precision agriculture concepts to provide insights for completing a lab activity.

As with other teaching tools, students who are exposed to an RLO can be given assessments in order to identify changes in content knowledge or attitude. According to Eagly and Chaiken (1993), attitudes can be seen as the predispositions of individuals to judge objects based on some predetermined evaluative scale. Often this scale tends to be bipolar: good vs. bad, favorable vs. unfavorable (Albarracín, Wang, Li, & Noguchi, 2008). An attitude object can be "a concrete target, a behavior, an abstract entity, a person, or an event" (Albarracín et al., 2008, p. 19), which, in the case of this study is the abstract entity captured by "Ecuadorian culture."

Additionally, attitudes have two components: memory and judgment (Albarracín et al., 2008):

> The memory component involves representations of the attitude in permanent memory; the judgment component involves on-line evaluative thoughts generated about an object at a particular place and time. (p. 19)

Based on these components, Albarracín, Glasman, and Wallace (2004) conceptualized the role of memory and on-line information in creating evaluative judgments in their Activation and Comparison Model. According to this model, attitude change depends on three distinct processes: activation of prior attitudes through memory retrieval, activation of information related to the prior attitude, and a comparison of the prior attitude with the related information (Albarracín et al., 2008). Thus, when faced with information, a person may determine that the information presented is a basis for the pre-existing attitude and thus deem the information as redundant, or, if the information is new, the person may attempt to integrate that information into the current beliefs. Using comparative processes, integration may result in viewing the new information as valid (thus creating a shift in attitude), or as invalid (resulting in dismissal of the information and retention of prior attitude) (Albarracín et al., 2008).

Previous research can be found that has examined the effect of RLO use on attitudes, though it has often focused on the attitudes that students hold towards the RLO as a presentation tool (e.g. Bloomfield, 2008; Chyung, Moll, Marx, Frary, & Callahan, 2010) rather than shifts in attitude toward the content being presented (e.g. Keefe & Wharrad, 2012). Furthermore, there is the potential for the RLO to impact attitudes towards both content and culture when the presented content includes a strong cultural component. It is understood that students enter an RLO presentation with a set of pre-existing attitudes. However, additional research is needed to better understand how undergraduate exposure to RLOs may impact these student attitudes and beliefs.

Purpose/Objectives

This study investigated whether undergraduate attitudes' about a foreign country would be influenced by exposure to an RLO when that country was used as the context to present subject-matter knowledge. Research objectives for this paper were to: (a) identify pre-existing undergraduate attitudes regarding Ecuador prior to RLO exposure; (b) identify undergraduate attitudes regarding Ecuador following RLO exposure; and (c) determine if undergraduate attitudes regarding Ecuador were significantly different before and after RLO exposure.

Methods/Procedures

This descriptive study utilized a one-group pretest-posttest design (Ary, Jacobs, Razavieh, & Sorensen, 2006) for each RLO implementation. This design allows researchers to determine differences attributed to the RLO exposure through a comparison of pretest and posttest scores (Ary et al., 2006). The RLOs used for this study were created by six of the eight project faculty. These six faculty members had completed the process of creating, editing, and implementing their RLO within the 24 months following the international experience. These six faculty members were from the departments of: Agricultural and Biological Engineering; Agricultural Education and Communication; Agronomy; Family, Youth, and Community Science; Food Science and Nutrition; and Religion. Faculty were charged with implementing an RLO that they created into at least one of their classes. A census of students in each these classes was conducted. Students were enrolled in these classes in either Fall 2011, Spring 2012, or Fall 2012 (see Table 1).

Table 1
Summary of Each Course RLO Implementation

Department	Semester	Course	Course Level	Student Numbers
Agronomy	Fall 2011	Plants that Feed the World	Lower	12
Religion	Spring 2012	Religion and Environmental Crisis	Lower	22
Agricultural Education & Communication	Fall 2011	Communication Process in Ag and Life Sciences	Upper	38
Family, Youth & Community Sciences	Spring 2012	Methods in Family Life Education	Upper	45
Agricultural & Biological Engineering	Spring 2012	Precision Agriculture	Upper	23
Food Science & Nutrition	Fall 2012	Nutrition and Disease	Upper	60

Activities undertaken in this study were approved by the University of Florida Institutional Review Board and signed informed consent was obtained from all participants. Instrument construction for data collection began Summer 2011. Using Thurstone's Method of Equal-Appearing Intervals (Trochim, 2004), undergraduate students (from six large survey courses designed to cover a variety of introductory agricultural topics within the College of Agriculture and Life Sciences) were asked to provide researchers with two statements that captured attitudes they believed undergraduate peers may have regarding Ecuador, resulting in 114 unique statements. The statements ranged in ideas from thoughtful ("People in Ecuador have trouble focusing on good education due to their extreme poverty") to uninformed ("I do not know anything about the country."). The cards on which each statement was written were then given to 15 graduate students within the same college to sort into 11 individual piles, arranged from least favorably appearing (score of 1) to most favorable (score of 11) (Trochim, 2004). Scores for each statement were then recorded, the median and inter-quartile range (IQR) identified for each response, and the 114 items sorted in ascending order by median and descending order by IQR (Trochim, 2004).

This process resulted in no statements having a median score of 1 or 11; therefore, the scale was adjusted to represent a 9-point scale (with 1 being least favorable, 9 being most favorable). One statement was then selected for each of the remaining nine median values, using the statement with the smallest IQR so as to capture the statement with the lowest variability across the judges (Trochim, 2004). The pretest instrument was then constructed from these nine statements, with the items randomly arranged according to median score and with a simple Agree/Disagree response option for each statement provided to the right of the statement. The posttest instrument created was an identical duplication of the first instrument, with the exception of two questions at the bottom of the instrument included to probe prior student exposure to the country of Ecuador during their time at the University of Florida. Data collection using the attitudinal instrument began in Fall 2011and continued through Fall 2012. Each student participant was given the opportunity to decline participation in the data collection process, though all experienced exposure to the RLO presentation. No more than nine students opted out of participating in the data collection process in any given course. Hard copies of the pretest and posttest were presented to participating students, with the pretest given before the RLO presentation and the posttest given at the end of the class period. No personal information was collected from students except for individual markers to allow for pretest/posttest matching.

Items from the pretest/posttest were scored using the method outlined by Thurstone (Trochim, 2004). Students were asked to either “Agree” or “Disagree” with the nine statements provided. Students were then given a score that represented the average of the scale values for the “Agreed” items. An average score greater than 4.50 (the mid-point on a 9-point scale) would indicate a more positive set of attitudes, while an average score less than 4.50 would indicate a more negative set of attitudes held by the student. Change in student attitude was examined by comparing the posttest/pretest difference, with a positive difference indicating an increasingly positive impact and a negative difference indicating an increasingly negative impact.

Common limitations of a one-group prettest-posttest design include: history, maturation, and testing effects (Ary et al., 2006). History, the impact of events that happen outside the intervention, and maturation, the changes in subjects over time, have little to no impact on the RLO participants since the pretest, exposure, and posttest all took place within a period of 1-2 hours of each other and all within a single class period. However, one effect that may have impacted internal validity for this study was the exposure of the participants to the pretest. This exposure may have inadvertently sensitized the participants to the information, allowing them to learn from the pretest itself, rather than from the presented RLO (Ary et al., 2006). Therefore, the significance of changes evident from student pretest-posttest differences is cautiously reported.

Descriptive analyses of pretest, posttest, and post-pretest differences were performed for all classes. In order to identify whether significant class-based differences existed, an ANOVA was performed. Post hoc analyses were run using a Scheffe post hoc comparison to identify where resulting significant differences exist between groups. The Scheffe was chosen over alternative post hoc analyses due to its conservative nature under complex conditions of unequal cell sizes (Vogt, 2005). Furthermore, a histogram was utilized to explore post-pre differences and suggested a positive trend for attitude change. Paired *t*-tests were performed on the pretest/posttest pairs for each class to determine whether significant changes in attitude could be claimed within each class setting following RLO exposure.

Results/Findings

Descriptive statistics for both the pre and post-test data were calculated in order to determine if undergraduate attitudes regarding Ecuador were significantly different before and after RLO exposure. Table 2 provides the frequency of “agree” responses collected for each of the Thurstone Scale items across the six classes, as well as the frequency change between pre-test and post-test responses. The pre-test and post-test mean and standard deviations for each class, as well as across classes, are then provided in Table 3.

Table 2
Frequency of "Agree" Response for the Nine Thurstone Scale Statements (*N*=179)

Item (favorability)	*n*	*n*	*n*
	Pre-test	Post-test	Change
(1) Ecuador has high crime rates.	101	59	-42
(2) There is a lot of poverty in Ecuador.	167	145	-22
(3) People in Ecuador have trouble getting jobs.	117	80	-37
(4) Fashion is dated in Ecuador.	58	66	8
(5) Ecuador isn't any different than other Latin American countries.	24	30	6
(6) Export is very important in Ecuador.	139	150	11
(7) Culture and history are important to the people of Ecuador.	177	177	0
(8) Education is very important in Ecuador.	108	135	27
(9) Ecuador is a beautiful country.	177	174	-3

Note. Items are listed in increasing order of favorableness as determined through the Thurstone Scaling process. Frequencies listed indicate the number of times "Agree" was chosen for each item during the pre-test and post-test, respectively.

Table 3
Summary of Means/Standard Deviations for Each Class and Across Classes

	Class 1 (*n* = 11)	Class 2 (*n* = 35)	Class 3 (*n* = 40)	Class 4 (*n* = 20)	Class 5 (*n* = 20)	Class 6 (*n* = 51)	All (*N* = 177)
Pretest							
M	5.28	5.53	5.35	5.46	5.49	5.22	5.37
SD	0.54	0.87	0.88	0.45	0.65	0.64	0.73
Posttest							
M	5.90	5.94	5.64	5.40	5.85	6.06	5.83
SD	0.46	0.88	0.75	0.42	0.77	1.00	0.84
Post-Pre Difference							
M	0.62	0.41	0.28	-0.06	0.36	0.84	0.46
SD	0.67	0.91	0.85	0.58	0.50	0.99	0.88

Using the same 9-point scale as before (1 = *least favorable*, 9 = *most favorable*), results from the basic descriptive analysis reveal that each class began with a slightly positive attitudinal outlook on Ecuador as evidenced by pretest mean scores higher than 4.5 (the median for a 9-point scale). Analysis also revealed a mean increase from pretest to posttest for five of the six classes, with Class 4 being the exception (mean difference = -0.06). Furthermore, it is apparent from the pre/post change column in Table 2 that notable shifts in Item 1, 2, 3, and 8 occurred as a result of RLO exposure. Items 1, 2, and 3 represented the least favorable perceptions that students had an opportunity to agree or disagree with, while Item 8 represented one of the most favorable perceptions. These four items had the greatest change in student perceptions for each of the individual items.

An ANOVA was conducted to determine whether significant class-based differences existed for three areas: pretest score, posttest score, and pre/post difference. Results from the ANOVA revealed no significant difference ($\alpha = .05$) between the six courses in one of the three areas: pretest score $F(5, 171) = .98$, $p = .434$. Therefore, all students in each of the exposed classes are believed to be the similar in attitude toward Ecuador prior to RLO exposure. However, results of the ANOVA revealed significant differences in both the posttest score $F(5, 171) = 2.50$, $p = .033$ and pre/post difference score $F(5, 171) = 4.132$, $p = .001$. In order to identify where the significant differences between class scores existed, a Scheffe post hoc analysis was conducted at $\alpha = .05$. A summary of *p*-values associated with group to group comparisons using the Scheffe post hoc analyses are provided in Table 4.

Table 4
Summary of p-*values from Scheffe Post Hoc Analyses for Each Class*

		Class 2	Class 3	Class 4	Class 5	Class 6
Posttest	*Class 1*	1.000	.972	.754	1.000	.996
	Class 2		.774	.359[a]	1.000	.993
	Class 3			.950	.970	.314[a]
	Class 4				.694	.101[a]
	Class 5					.966
Post-Pre Difference	*Class 1*	.990	.926	.461	.985	.987
	Class 2		.996	.560	1.000	.359[a]
	Class 3			.811	1.000	.087[a]
	Class 4				.765	.007[b]
	Class 5					.470

Note: [a] Refers to p-values that are impacting the *F*-statistic, but are not themselves statistically significant; [b] Refers to p-values that are themselves statistically significant

Results from the post hoc provide greater insight into the dynamics occurring between classes not apparent from the initial ANOVA analysis. First, no significant difference between any two groups occurs when the Scheffe post hoc analysis is run on the posttest data. This finding suggests that the statistically significant *F*-statistic from the ANOVA is not due to a statistically significant difference between any two classes but may instead be indicative of a more global effect occurring between all six of the classes. This effect may also be compounded by the differences found between Class 2 and Class 4; Class 3 and Class 6; and Class 4 and Class 6 ($p < .40$). Second, only one significant difference between groups occurs (Class 4 and Class 6; $p = .007$) when the Scheffe post hoc analysis is run on the post-pre difference scores. Similar to the posttest results, the *F*-statistic also may be displaying a more global effect, including an influence of differences between Class 2 and Class 6; and Class 3 and Class 6 ($p < .40$).

A histogram of post/pretest score differences was created to visually examine the data's distributional qualities (see Figure 1). The distribution of scores suggests a positive trend in attitude change between the pretest and posttest. While this distribution suggests that attitudes were more favorable following RLO exposure, it is unclear if this was true for each class.

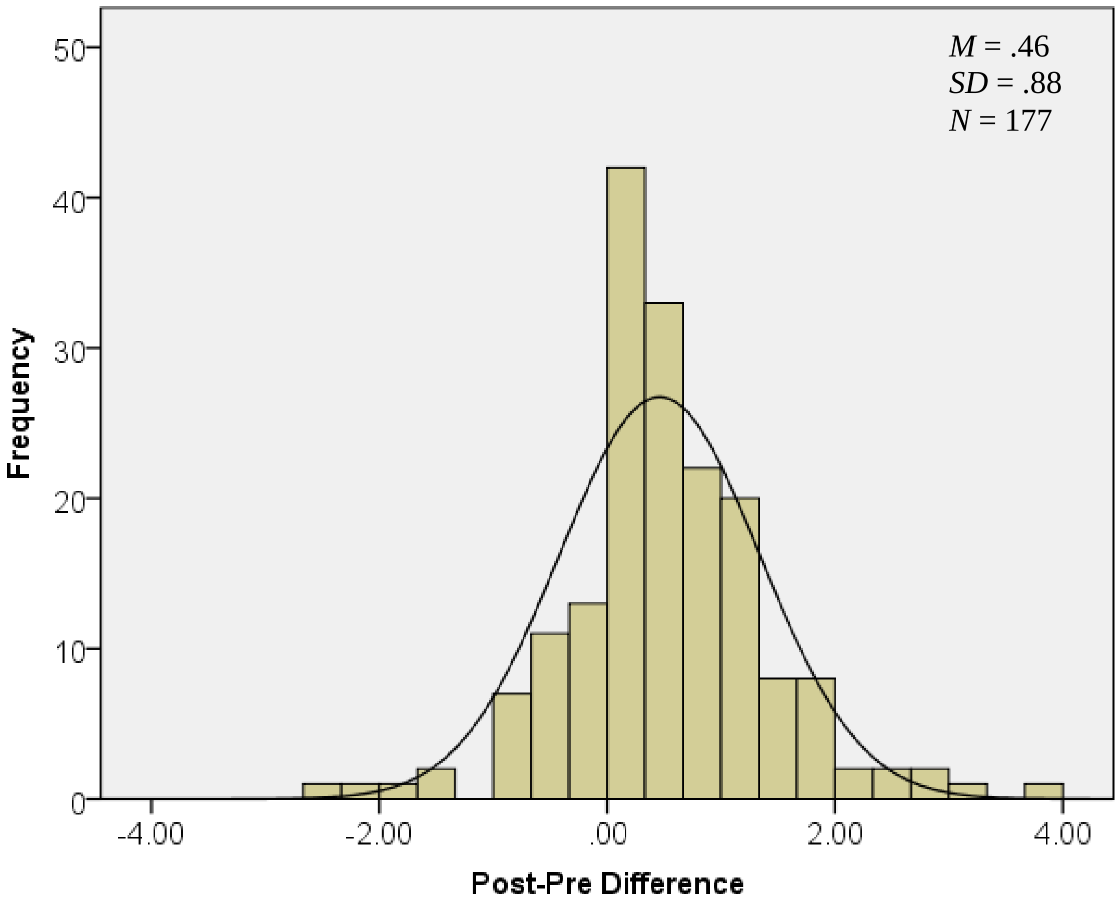

Figure 1: Histogram of post-pre difference frequencies. This histogram represents the frequency distribution of post-pre differences for student attitudes based on Thurstone Scale analysis.

Paired *t*-tests were performed on pretest/posttest pairs for each class in order to identify whether a statistically significant shift in attitude occurred in all classes. Results from this analysis revealed no significant difference at in the pretest and posttest for:

- Class 4: pre (M = 5.46, SD = 0.45), post (M = 5.40, SD = 0.42); $t(19) = .483$, $p = .635$

These results suggest that RLOs utilized in this one class failed to create a significant change in student attitudes towards Ecuador. Class 1 did have a mean score shift that, while not statistically significant (most likely due to the small class size), still indicates a positive change since the mean scores shifted from M = 5.28 (pre) to M = 5.90 (post).

Significant differences ($\alpha = .05$) in pretest and posttest were found for:

- Class 1: pre (M = 5.28, SD = 0.54), post (M = 5.90, SD = 0.46); $t(10) = -3.094$, $p = .011$
- Class 2: pre (M = 5.53, SD = 0.87), post (M = 5.94, SD = 0.88); $t(34) = -2.633$, $p = .013$
- Class 3: pre (M = 5.35, SD = 0.88), post (M = 5.64, SD = 0.75); $t(39) = -2.108$, $p = .041$
- Class 5: pre (M = 5.49, SD = 0.65), post (M = 5.85, SD = 0.77); $t(19) = -3.259$, $p = .004$
- Class 6: pre (M = 5.22, SD = 0.64), post (M = 6.06, SD = 1.00); $t(50) = -6.055$, $p = .000$

These results suggest that RLOs utilized in these six classes helped to create a significant change in student attitudes towards Ecuador.

Conclusions/Recommendations/Implications

The preliminary results of this study suggest that undergraduate attitudes about a foreign country may be influenced by exposure to an RLO when that country is used as the context to present subject-matter knowledge. Results of the pre-tests indicate students had somewhat favorable attitudes toward Ecuador, with each class displaying a mean pretest score greater than the median score of 4.5. Following the RLO, the posttests suggest increasingly positive attitudes about Ecuador, with five of the six classes exhibiting a positive shift in attitude. The largest shifts in attitudes were evidenced by notable decreases at the lower, or least favorable, end of the Thurstone Scale (Items 1-3) and notable positive increases in the upper, or most favorable, end (Item 8). Based on the Activation and Comparison Model (Albarracín et al., 2004), this would suggest that students in five classes found the information in the RLOs to be valid resulting in the recorded shifts. Though hindered by limitations of this study (small non-generalizable population and testing effects), the findings do allude to the possibility of using tools such as the RLO to improve undergraduate attitudes about a foreign country when using that country as a context for presenting subject-matter knowledge.

It appears that the Thurstone Method of Equal-Appearing Intervals (Trochim, 2004) can be used to develop an instrument that is sensitive enough to track attitudinal changes with respect to RLO use. However, further research will need to be done to examine whether multiple RLO exposure has the potential to increase this effect. More rigorous testing situations, including use of control classes to account for testing effects and random selection of classroom exposures, should be utilized for future research endeavors. These steps would help to alleviate the impact of alternative effects to be captured within the change suggested by the post-pre difference. Additionally, it would be prudent to examine the temporality or permanence that exposure has over time. Finally, it would be educational to examine whether RLOs have the power to negatively influence students' perceptions of a foreign country, and if so, what attributes of the RLO are responsible for mediating such a change.

If future agricultural and life science students are to be prepared to actively engage in the complex issues of the ever-changing global nature of agricultural enterprise (National Academy of Science, 2009), then educators must be able to identify and properly utilize models, strategies and tactics that will properly prepare them (American Association for Agricultural Education, 2011). The potential for attitudinal shifts due to vicarious exposure through RLOs is promising, especially in light of the absence of authentic exposures for many American undergraduate students. However, universities will need to provide additional investment and administrative support for the professional study abroad experiences necessary for such resource development, with RLO development integrated as a formalized expectation of the opportunity.

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