AN EXAMINATION OF OKLAHOMA AGRICULTURAL EDUCATORS' INNOVATIVENESS AND PERCEPTIONS REGARDING THE MANDATED ADOPTION AND USE OF THE AGRICULTURAL EXPERIENCE TRACKER

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Title of Study: AN EXAMINATION OF OKLAHOMA AGRICULTURAL EDUCATORS' INNOVATIVENESS AND PERCEPTIONS REGARDING THE MANDATED ADOPTION AND USE OF THE AGRICULTURAL EXPERIENCE TRACKER

Major Field: AGRICULTURAL EDUCATION

Abstract: Record keeping has been long regarded as an essential skill related to the success of students' supervised agricultural experience (SAE) programs. Following the integration of computers in school-based agricultural education (SBAE), several electronic, record keeping mediums entered the marketplace. Despite its increasing prominence, The Agricultural Experience Tracker (the AET) has been narrowly researched, and no literature regarding its diffusion or adoption presently exists. As such, this study served to address this paucity of literature by examining this phenomenon through the lens of Rogers' (2003) diffusion of innovations theory. The two-fold purpose of this study was to 1) describe the relationships between the innovativeness of SBAE programs in Oklahoma and the perceptions of SBAE teachers regarding diffusion of the AET; 2) predict the innovativeness of SBAE programs in Oklahoma from SBAE teachers' selected personal and professional characteristics and perceptions regarding diffusion of the AET. This study was descriptive, predictive, and correlational in nature, and employed a cross-sectional, survey design. Prior to data collection and in accord with Rogers' (2003) conventions, every SBAE program in Oklahoma was categorized by innovativeness regarding adoption and use of the AET. From the findings, it was concluded that the SBAE programs with older and/or more experienced teachers were more innovative than those with younger and/or less experienced teachers. Collectively, SBAE teachers in Oklahoma considered the AET to be complex. However, in addition to perceiving the AET as being less relatively advantageous and compatible, the SBAE teachers with more years of experience considered the AET to be less complex than those with fewer years of experience. Time-related concerns were identified as a strong barrier to SBAE teachers' adoption and use of the AET. Finally, using hierarchical, block regression analysis, a predictive model for SBAE program innovativeness was developed, with the third model explaining a total of 26% of the variance in SBAE program innovativeness. Targeted, in-service training opportunities are recommended in the areas of use and navigation of the AET, financial accounting, and time management. Further investigation of the AET's diffusion is recommended in other states, as well as in both mandated and voluntary use contexts.

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CHAPTER I

INTRODUCTION

Despite the seemingly universal notion that Supervised Agricultural Experience (SAE) is a critical component of the total, school-based agricultural education (SBAE) program (Wilson & Moore, 2007), a trend of declining SAE participation has been reported for the last several decades (Dyer & Osborne, 1995; Moore, 1979; Osborne, 1988; Retallick & Martin, 2005; Steele, 1997). Although research has yielded several different deterrents to SAE participation, challenges associated with record keeping have surfaced in noticeable quantities (Foster, 1986; Layfield & Dobbins, 2002; Miller & Scheid, 1984; Pfister, 1983; Wilson & Moore, 2007). The literature suggests record keeping has been long regarded as an essential skill related to the success of SAE programs (Boone, 2010; Camp, Clarke, & Fallon, 2000; Davis & Williams, 1979; Ford, Tarpley, & Frazier, 2012; Jenkins & Kitchell, 2009; Moore, 1979; Phipps, Osborne, Dyer, & Ball, 2008; Rubenstein & Thoron, 2014). However, SBAE teachers and students alike appear to struggle with the practice (Foster, 1986; Layfield & Dobbins, 2002; Miller & Scheid, 1984; Pfister, 1983; Wilson & Moore, 2007).

Following the integration of computer-based technology in SBAE, the aforementioned challenges were answered by the emergence of several electronic, record keeping mediums (Ermis & Dillingham, 2002; EZ Records, 2017a; FFA Record Book Pro, 2016; The Agricultural

Experience Tracker, 2017a). One web-based record keeping system, The Agricultural Experience Tracker (the AET), appears to have successfully begun its diffusion within the SBAE profession (The Agricultural Experience Tracker, 2017a; National FFA Organization, 2013). However, this feat has yet to be confirmed, as no research regarding diffusion and adoption of this innovation presently exists.

Background of the Study

Having been in formal existence for the last century, agricultural education has three fundamental aims: (a) to prepare students to enter and advance in agricultural careers, (b) to create opportunities for entrepreneurship and employment, and (c) to cultivate agricultural literacy (Phipps, Osborne, Dyer, & Ball, 2008). These objectives have allowed agricultural educators to provide instruction both *in* and *about* the field of agriculture (Phipps et al., 2008). More specifically, providing education *in* the discipline of agriculture allows students to gain awareness of potential careers by way of practical application, whereas providing education *about* agriculture enables students to become both educated consumers and practitioners (Phipps et al., 2008).

As a discipline, agricultural education is experiential by design (Baker, Robinson, & Kolb, 2012; Cheek, Arrington, Carter, & Randell, 1994; Knobloch, 2003; Phipps et al., 2008; Roberts, 2006; Stewart & Birkenholz, 1991). Often, this experiential orientation is attributed to the universal emphasis agricultural educators place on "learning by doing" (Phipps et al., 2008, p. 7), and is reflected by the three principal components of the total school-based agricultural education (SBAE) program: classroom and laboratory instruction, FFA participation, and SAE implementation (Phipps et al., 2008; Talbert, Vaughn, Croom, & Lee, 2007; see Figure 1). As such, in the provision of a holistic agricultural education, equal emphasis should be placed on each of the foundational tenets of SBAE (Talbert et al., 2007).

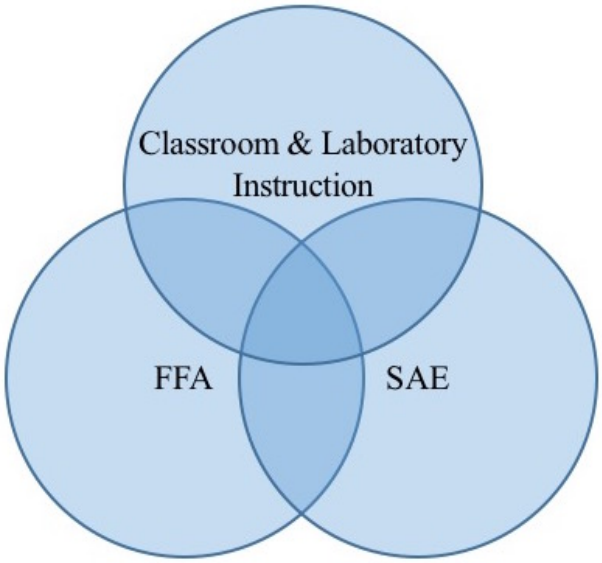

Figure 1. The tripartite model of the total school-based agricultural education program. Adapted from *Foundations of Agricultural Education* (p. 107), by B. A. Talbert, R. Vaughn, D. B. Croom, & J. S. Lee, 2007, Danville, IL: Professional Educators Publications, Inc.

The SAE component of the total SBAE program allows students to apply the content learned in class in authentic and individualized settings (Dyer & Osborne, 1995; Dyer & Williams, 1997; Phipps et al., 2008; Talbert et al., 2007). This concept initially emerged as Stimson's (1919) *project method* (Moore, 1988; Phipps et al., 2008), which enabled students to acquire new, and sharpen preexisting, agricultural skills by working on their own or other local farms (Stimson, 1919). Following the passage of the Smith-Hughes Act of 1917, implementation of Stimson's (1919) project method was mandated among all federally-funded, vocational programs (Camp et al., 2000; Stimson & Lathrop, 1942). Nearly fifty years later, the Vocational Education Act of 1963 expanded the scope of the project method to accommodate a larger variety of agricultural interests, including off-farm occupations (Phipps et al., 2008). Even after the passage of these legislative acts, SAE has continued to evolve (Phipps et al., 2008). At this point in time, six distinct categories of SAE exist: exploratory, placement, ownership/entrepreneurship, research, service learning, and school-based enterprise (Phipps et al., 2008; National Council for

Agricultural Education, 2015). Notwithstanding these attempts to expand the pedagogic scope of SAE, participation and implementation have been on the decline for the last several decades (Dyer & Osborne, 1995; Moore, 1979; Osborne, 1988; Retallick & Martin, 2005; Steele, 1997; Wilson & Moore, 2007). Even though the practice of record keeping has been identified as a critical component of SAE (Boone, 2010; Camp et al., 2000; Davis & Williams, 1979; Ford et al., 2012; Jenkins & Kitchell, 2009; Moore, 1979; Phipps et al., 2008; Rubenstein & Thoron, 2014), it has also been recognized as an impediment to SAE participation and implementation (Foster, 1986; Wilson & Moore, 2007).

Many technological advancements have been made since the inception of SAE. For instance, computers have become a staple in most modern classrooms and businesses (Mueller, Wood, Willoughby, Ross, & Specht, 2008; Phipps et al., 2008). As such, to better portray SAE record keeping as a beneficial practice for students, Phipps et al. (2008) recommended that SBAE teachers begin transitioning to computerized, record keeping systems. This integration of computer-based technology is especially essential when examining the technological dissonance among digital immigrants and digital natives (Prensky, 2001). As stated by Prensky (2001), "the single biggest problem facing education today is that our Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language" (p. 3). Perhaps in recognition of this issue, the literature has indicated that SBAE teachers are making focused efforts to appeal to their digital native students by transitioning to computerized, SAE record keeping practices (DeShazo et al., 2003; Phipps et al., 2008).

Computerized practices of SAE record keeping can be traced back to the 1980s (Church & Foster, 1984; Henderson, 1985). By the early 2000s, CD-ROMS, software packages, Microsoft Excel templates, and web-based systems had emerged as tools to aid SBAE teachers and students in the practice (DeShazo et al., 2003). However, while there appears to be no shortage of SAE

record keeping innovations, there is a paucity of research regarding their diffusion and adoption by SBAE teachers and students.

Statement of the Problem

Having been used by more than 850,000 students in 46 states (The Agricultural Experience Tracker, 2017a), the AET appears to be diffusing throughout the SBAE social system. In recognition of the innovation's increasing prevalence, the Agricultural Education Division of the Oklahoma Department of Career and Technology Education (CareerTech) made an authority innovation-decision to adopt the AET as Oklahoma's official, SAE record keeping medium (J. Staats, personal communication, December 1, 2015). In April of 2014, the Oklahoma House of Representatives approved House Bill (HB) 3006, requiring every SBAE student in Oklahoma to maintain a SAE program. As a result, the authority innovation-decision made by the Agricultural Education Division of CareerTech became a mandate for adoption, as use of the AET would also serve as a means of SAE documentation.

As an innovation, the AET has been narrowly researched. Moreover, even though the literature base pertaining to the AET is limited, there is an even greater deficiency of research on how the innovation has been diffused. At present, no literature regarding diffusion or adoption of the AET is in existence. As such, this study sought to address this absence of literature by examining the diffusion and adoption of the AET among SBAE programs in Oklahoma.

Purpose of the Study

The two-fold purpose of this study was to 1) describe the relationships between the innovativeness of SBAE programs in Oklahoma and the perceptions of SBAE teachers regarding diffusion of the AET; 2) predict the innovativeness of SBAE programs in Oklahoma from SBAE teachers' selected personal and professional characteristics and perceptions regarding diffusion of the AET.

Statement of the Research Questions

Twelve research questions were developed to guide this study:

1. To what degree did SBAE programs in Oklahoma from each adopter category utilize selected features of the AET in 2015?
2. What were selected characteristics of SBAE programs in Oklahoma from each adopter category?
3. What were selected personal and professional characteristics of study participants (e.g., SBAE teachers in Oklahoma) from each adopter category?
4. What were the study participants' views on selected attributes impacting diffusion of the AET?
5. What were the study participants' views on selected barriers to diffusion of the AET?
6. What relationships existed between selected characteristics of SBAE programs in Oklahoma and their derived innovativeness scores?
7. What relationships existed between selected personal and professional characteristics of study participants and the derived innovativeness scores of their SBAE programs?
8. What relationships existed between selected SBAE program characteristics and study participants' views on attributes impacting diffusion of the AET?
9. What relationships existed between selected personal and professional characteristics of study participants and their views on attributes impacting diffusion of the AET?
10. What relationships existed between selected SBAE program characteristics and study participants' views on barriers to diffusion of the AET?

11. What relationships existed between selected personal and professional characteristics of study participants and their views on barriers to diffusion of the AET?

12. Can SBAE program innovativeness regarding adoption and use of the AET be predicted by study participants' selected personal and professional characteristics and views on attributes impacting diffusion of the AET?

Significance of the Study

In addition to addressing a present gap in the SBAE literature base, this study will also divulge some potential in-service training needs of teachers regarding SAE record keeping and use of the AET. However, the significance of this study is not limited to those within the SBAE profession. As a nation, the United States is presently facing an economic crisis. "At 77 percent of gross domestic product (GDP), federal debt held by the public is now at its highest level since shortly after World War II" (Congressional Budget Office, 2017, p. III). Over the next ten years, the federal government is expected to borrow an additional $10.1 trillion, increasing the publicly-held debt to nearly 90% of GDP (Congressional Budget Office, 2017). According to Fox, Bartholomae, and Lee (2005), "burdensome consumer debt, low savings rates, and record bankruptcies are commonly considered the result of low financial literacy levels" (p. 195).

"Financial illiteracy is a problem Americans can't afford to ignore" (Barry, 2013, p. 7). To address this problem, several states, including Oklahoma, have adopted compulsory, curricular standards pertaining to personal, financial literacy (Council for Economic Education, 2016). In Oklahoma, as required by the Passport to Financial Literacy Act of 2007, all school districts must provide instruction in personal, financial literacy by integrating the required, curricular standards into existing courses, or by offering a separate course in personal, financial literacy. The SBAE program is one avenue through which a school district may accomplish this. In addition to potential course offerings directly related to agricultural economics and

agribusiness management, SBAE students may also be exposed to instruction in financial literacy through SAE participation. The practice of SAE record keeping is largely based on financial principles, as "students are responsible for budgeting and keeping financial records of income and expenses" (Newcomb, McCracken, & Warmbrod, 1993, p. 243). Therefore, in addition to the above-mentioned contributions to the SBAE profession, this study will also assist school administrators and state policy leaders in recognizing SBAE and SAE as pragmatic vehicles for the delivery of personal, financial literacy education.

Definition of Terms

Adopter Categories: Rogers' (2003) proposed "classifications of members of a social system on the basis of innovativeness" (p. 22)

Agricultural Education: "systematic instruction in agriculture and natural resources at the elementary, middle school, secondary, postsecondary, or adult levels for the purpose of (1) preparing people for entry or advancement in agricultural occupations and professions, (2) job creation and entrepreneurship, and (3) agricultural literacy" (Phipps et al., 2008, p. 3)

Attributes: qualities that shape potential adopters' perceptions regarding an innovation during the persuasion stage of the innovation-decision process (Rogers, 2003)

Authority Innovation-Decisions: "choice to adopt or reject an innovation that is made by a relatively few individuals in a system who possess power, status, or technical expertise" (Rogers, 2003, p. 473)

Classroom and Laboratory Instruction: a key component of the total SBAE program, delivered to "set the stage for understanding, application, and problem solving" (Phipps et al., 2008, p. 6)

Compatibility: "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (Rogers, 2003, p. 240)

Complexity: "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers, 2003, p. 257)

Cosmopoliteness: the extent to which individuals are oriented, or willing to venture, outside of their local, social systems (Rogers, 2003)

Diffusion: "the process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p. 5)

Digital Immigrants: individuals who were born prior to the surge of technology beginning in 1980 (Bennett, Maton, & Kervin, 2008; Prensky, 2001)

Digital Natives: individuals who were born after 1980 and have never lived without computers or other related means of technology (Bennett et al., 2008; Carlacio & Heidig, 2011; Prensky, 2001)

Early Adopters: the adopter category that is comprised of the most respected members of the social system and often holds the greatest degree of opinion leadership (Rogers, 2003)

Early Majority: the adopter category representing those individuals who "adopt new ideas just before the average member of a system" (Rogers, 2003, p. 283)

Experiential Learning: "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 41)

Exploratory SAE: a type of SAE which allows students to develop agricultural literacy and/or awareness of potential careers within the field of agriculture, food, and natural resources (NCAE, 2015)

Innovation: a new idea, practice, or tangible object (Rogers, 2003)

Innovation-Decision Process: the process whereby an individual or group decision-making entity first learns of an innovation, forms an opinion about it, decides to adopt or reject it, implements the decision, and then confirms the decision (Rogers, 2003)

Innovativeness: "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system" (Rogers, 2003, p. 280)

Innovators: the first members of the social system to adopt an innovation, described by Rogers (2003) as being "venturesome" (p. 282)

Laggards: "the last in a social system to adopt an innovation" (Rogers, 2003, p. 284)

Late Majority: regarded by Rogers (2003) as the "skeptical" members of a social system, these individuals "adopt new ideas just after the average member of a system" (p. 284)

Mandate for Adoption: an instrument utilized by a social system to pressure its members into acknowledging the relative advantage of a particular innovation (Rogers, 2003)

National FFA Organization: "an educational, nonprofit, nonpolitical youth organization for students enrolled in school-based agricultural education programs" (Phipps et al., 2008, p. 6)

Observability: "the degree to which the results of an innovation are visible to others" (Rogers, 2003, p. 258)

Opinion Leadership: "the degree to which an individual is able to influence other individuals' attitudes or overt behavior informally in a desired way with relative frequency" (Rogers, 2003, p. 27)

Ownership/Entrepreneurship SAE: a type of SAE whereby "the student plans, implements, operates and assumes financial risks in a productive or service activity or agriculture, food or natural resources-related business" (NCAE, 2015, p. 2)

Personal Characteristics: the demographic qualities of participants which are personal in nature, such as sex, race or ethnicity, and age

Placement SAE: a type of SAE by which students obtain paid or unpaid employment in agricultural settings (NCAE, 2015)

Professional Characteristics: the demographic qualities of participants regarding their education and professional skills, certifications, experience, and behaviors

Relative Advantage: "the degree to which an innovation is perceived as being better than the idea it supersedes" (Rogers, 2003, p. 229)

Research SAE: a type of SAE which allows students to conduct experimental, analytical, or inventive research related to the field of agriculture, food, and natural resources (NCAE, 2015)

School-Based Enterprise SAE: a type of SAE consisting of "a student-managed, entrepreneurial operation in a school setting that provides goods or services that meet the needs of an identified market" (NCAE, 2015, p. 3)

Service Learning SAE: a type of SAE whereby students are responsible for managing a service activity, which should include "the development of a needs assessment, planning the goals, objectives and budget, implementation of the activity, promotion, and evaluation/reflection of a chosen project" (NCAE, 2015, p. 3)

Supervised Agricultural Experience (SAE): "all the agricultural activities of educational value conducted by a student outside of the class for which systematic instruction and supervision are provided by parents, the agriculture teacher, employers, and other adults" (Newcomb et al., 1993, p. 223)

The Agricultural Experience Tracker (the AET): an online record keeping system used for documenting classroom learning and SAE-related experiences and expenses (The Agricultural Experience Tracker, 2017a)

Trialability: "the degree to which an innovation may be experimented with on a limited basis" (Rogers, 2003, p. 258)

Uncertainty: "the degree to which a number of alternatives are perceived with respect to the occurrence of an event and the relative probabilities of these alternatives" (Rogers, 2003, p. 476)

Limitations of the Study

Provided the boundaries that accompany Institutional Review Board (IRB) compliance, as well as the inherent nature of social research, the generalizability of this study was limited by

two primary factors. First, combined with anonymity, recent turnover of certain SBAE teachers in Oklahoma posed limitations for this study. To elaborate, because every SBAE program in Oklahoma adopted the AET at approximately the same time, *innovativeness* was operationalized as the extent to which each SBAE program utilized the AET in 2015. Once each SBAE program was categorized by innovativeness in accordance with Rogers' (2003) proposed adopter categories, the SBAE teachers within those programs were assigned the same category by association. However, as some SBAE teachers have likely left the profession and/or switched SBAE programs since 2015, it is possible that certain participants' responses to the survey instrument may not be reflective of their inherited categories. Moreover, because the participants' identities were concealed from the researcher, these cases were unable to be explicitly recognized.

Second, the response rate posed another limitation for the study. Because this study was conducted as a census, generalizability was not of concern. However, the extent to which the results accurately describe the entire population was dependent on the number of participants who elected to respond (Johnson & Christensen, 2014).

Assumptions of the Study

After planning, conducting, and analyzing the results of this study, three assumptions were made:

1. All participants in this study were computer-capable and had sufficient access to the Internet.
2. While completing the survey instrument, the participants of this study made a conscious effort to provide authentic responses.

3. Participants' perceptions of the AET based on Rogers' (2003) attributes of innovations and selected barriers to its diffusion can be accurately measured by way of the survey instrument used in this study.

4. All participants had received mandatory training pertaining to the AET and were made aware of its basic functions and purpose.

Chapter Summary

Chapter I presented a brief overview of research pertaining to the AET, which resulted in the identification of the problem this study was intended to address. To achieve the purpose of the study, the researcher identified 12 research questions. Chapter I also provided definitions of relevant terms, as well as the limitations and assumptions of the study.

In addition to elaborating on the literature referenced in this chapter, Chapter II will present the theoretical framework of the study. The particular themes to be discussed in Chapter II will include the philosophical underpinnings of SBAE, the history, philosophy, and evolution of SAE, record keeping of SAE, computer integration in SBAE, electronic means of SAE record keeping, diffusion and adoption of the AET, and Rogers' (2003) diffusion of innovations theory.

CHAPTER II

REVIEW OF LITERATURE

The two-fold purpose of this study was to 1) describe the relationships between the innovativeness of SBAE programs in Oklahoma and the perceptions of SBAE teachers regarding diffusion of the AET; 2) predict the innovativeness of SBAE programs in Oklahoma from SBAE teachers' selected personal and professional characteristics and perceptions regarding diffusion of the AET. The following research questions guided the study:

1. To what degree did SBAE programs in Oklahoma from each adopter category utilize selected features of the AET in 2015?
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11. What relationships existed between selected personal and professional characteristics of study participants and their views on barriers to diffusion of the AET?

12. Can SBAE program innovativeness regarding adoption and use of the AET be predicted by study participants' selected personal and professional characteristics and views on attributes impacting diffusion of the AET?

This chapter serves to provide a review of literature regarding the diffusion of The Agricultural Experience Tracker (the AET) for the purpose of Supervised Agricultural Experience (SAE) record keeping in Oklahoma, school-based agricultural education (SBAE) programs. The topics studied include the philosophical underpinnings of SBAE, the history, philosophy, and evolution of SAE, record keeping of SAE, computer integration in SBAE, electronic means of SAE record keeping, diffusion and adoption of the AET, and the theoretical framework supporting this study.

Philosophical Underpinnings of School-Based Agricultural Education

Since the inception of SBAE, experiential learning has been regarded as the philosophical foundation upon which the discipline was built (Baker et al., 2012; Cheek et al., 1994; Knobloch, 2003; Roberts, 2006; Stewart & Birkenholz, 1991). Specifically, Kolb (1984) described the act of learning experientially as "the process whereby knowledge is created through the transformation of experience" (p. 41). According to Baker et al. (2012), "agricultural education is uniquely poised to help students through an effective model of instruction that is experiential in nature" (p. 12). Phipps et al. (2008) attributed the discipline's experiential orientation to the emphasis placed on "learning by doing" (p. 7). This emphasis is most evident when examining the learning opportunities made available through each of the three primary elements featured in the total SBAE program: classroom and laboratory instruction, FFA, and SAE (Phipps et al., 2008; Talbert et al., 2007; see Figure 1).

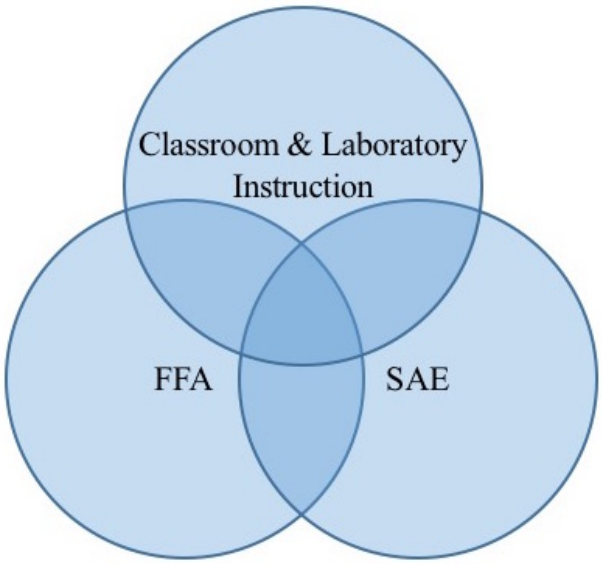

Figure 1. The tripartite model of the total school-based agricultural education program. Adapted from *Foundations of Agricultural Education* (p. 107), by B. A. Talbert, R. Vaughn, D. B. Croom, & J. S. Lee, 2007, Danville, IL: Professional Educators Publications, Inc.

Ideally, a comprehensive SBAE program should place equal emphasis on all three instructional elements to ensure that students are receiving a holistic, agricultural education (Talbert et al., 2007). Classroom and laboratory instruction, also referred to as contextual learning, serves as the primary basis of all learning that is to occur in the SBAE program (Talbert et al., 2007). In addition to affording students the opportunity to examine problems impacting the field of agriculture, food, and natural resources, classroom instruction also equips students with the knowledge necessary to theorize possible solutions to these problems (Phipps et al., 2008). Classroom instruction "sets the stage for understanding, application, and problem solving in the school-based laboratory and on farms, at nurseries, and in other settings" (Phipps et al., 2008, p. 6). Conversely, laboratory instruction allows students to practice and apply what they have learned in a controlled setting. According to Newcomb et al. (1993), laboratory instruction is essential for students to transform mere ideas into tangible skills. Moreover, it is through laboratory instruction that students are able to begin working toward the mastery of related skills (Newcomb et al., 1993; Phipps et al., 2008).

The SAE element of the total SBAE program provides students the opportunity to practice the concepts learned in class in real-life, individualized settings (Phipps et al., 2008). Moreover, these projects allow students to prepare for agricultural careers of interest while under the supervision of a SBAE teacher (Phipps et al., 2008; Talbert et al., 2007). In addition to providing students a pragmatic vehicle for skill acquisition, SAE also enables SBAE teachers to appeal to student interests through the delivery of individualized instruction (Hughes & Barrick, 1993; Phipps et al., 2008).

Participation in the National FFA Organization (FFA) is also expected of students belonging to comprehensive SBAE programs (Phipps et al., 2008; Talbert et al., 2007). Regarded by Talbert et al. (2007) as the student development element of the total SBAE program, FFA participation "connects classroom learning to life in the areas of leadership development, personal

growth, and career success" (p. 109). Because the FFA has been identified as an intra-curricular feature of the total SBAE program, participation in the organization is critical to the overall effectiveness of the instruction provided (Phipps et al., 2008; Talbert et al., 2007).

According to Phipps et al. (2008),

> agricultural education is based on a strong philosophy of learning through practice and application, individualized instruction, career and leadership development, community-based programs, and exposure to the agricultural industry as a dynamic, high-tech field of vital importance to individuals and society at large. (Phipps et al., 2008, p. 21)

Moreover, students must have equal access to each of the primary components of the total SBAE program to maximize the quality, scope, and impact of their education (Talbert et al., 2007).

The Role of the School-Based Agricultural Education Teacher

Similar to those of other disciplines, SBAE teachers are tasked with a variety of instructional responsibilities. As described by Kellough and Kellough (2011), these duties include:

- Becoming knowledgeable about the expected target learning outcomes;
- Planning units and lessons;
- Learning the needs and interests of the students so lessons will reflect those needs and interests;
- Incorporating relevant learning styles and learning modalities into the lessons;
- Reading student papers;
- Assessing and recording student progress;
- Preparing the classroom;
- Providing classroom instruction;

- Thinking about professional growth and development, which may include attending university courses, attending workshops and other presentations offered by the school district or professional organizations, and reading professional literature;
- Developing an effective classroom management system;
- Recalling the developmental characteristics of students this age;
- Learning the backgrounds of students with special problems who might cause concerns in the learning environment;
- Developing strategies and plans for cross-age tutoring, peer coaching, cooperative learning, project-based learning, and other developmentally appropriate learning strategies;
- Identifying resources and sources;
- Devoting time to team planning; and
- Holding conferences with individual students, parents, and guardians. (p. 39)

However, in addition to these responsibilities pertaining to instruction, SBAE teachers must also provide supervision and guidance for SAE programs, advise the FFA chapter, and build school and community partnerships (King & Miller, 1985; Phipps et al., 2008).

According to Roberts and Dyer (2004), "being an effective agriculture teacher goes beyond classroom teaching" (p. 94). Using a modified Delphi approach, Roberts and Dyer (2004) consulted a panel of experts to identify and categorize the characteristics of effective SBAE teachers. This panel was comprised of "two university teacher educators, two state FFA supervisory staff members, four county-level agricultural administrators, and 28 agriculture teachers" from Florida (Roberts & Dyer, 2004, p. 84). In the third round of data collection, the panel of experts reached consensus on the following items as characteristics of effective SBAE teachers:

- Cares for students;
- Effectively plans for instruction;
- Effectively evaluates student achievement;
- Is honest, moral, and ethical;
- Has a sound knowledge of FFA, actively advises the FFA chapter, and effectively prepares students for CDEs and other FFA activities;
- Communicates well with others;
- Effectively manages, maintains, and improves laboratories;
- Effectively recognizes achievements;
- Effectively motivates students;
- Has a love of agriculture (passionate for subject matter);
- Effectively manages student behavior; maintains discipline in class;
- Works well with other teachers and administrators in his/her school;
- Works well with parents;
- Effectively manages, operates and evaluates the Ag program on a continuous basis;
- Is motivated;
- Is resourceful;
- Has a sound SAE knowledge, actively supervises and encourages SAE projects;
- Puts in extra hours, is dedicated to doing a good job;
- Displays a positive/professional image;
- Encourages, counsels, and advises students;
- Effectively determines students needs;
- Enjoys teaching and exhibits a positive attitude towards the teaching profession;
- Uses a variety of teaching techniques;

- Incorporates science and other areas of the school curriculum into the agriculture program;
- Has excellent knowledge of the subject matter;
- Improves professionally by seeking opportunities for continued learning;
- Establishes and maintains good community relations;
- Effectively manages finances, grants, and special projects;
- Is innovative; uses technology in the classroom; adapts well to change;
- Is capable of solving problems and handling many different tasks at the same time;
- Is enthusiastic;
- Maintains an effective public relations program;
- Is self-confident;
- Is knowledgeable of teaching and learning theory;
- Takes actions to prevent burnout and to re-energize himself/herself;
- Effectively recruits new students;
- Is well organized; has excellent time management skills;
- Has an understanding and supportive spouse/family;
- Works well with alumni and advisory groups; and
- Is open-minded. (Roberts & Dyer, 2004, pp. 89-91)

From these characteristics, eight distinct categories emerged (Roberts & Dyer, 2004). In essence, effective SBAE teachers must exemplify the characteristics comprising each of the following domains: "instruction, FFA, SAE, building community partnerships, marketing, professional growth/professionalism, program planning, and personal qualities" (Roberts & Dyer, 2004, p. 93).

With the increasing number of roles and responsibilities related to the job, time has been recognized as a valuable resource for SBAE teachers (Phipps et al., 2008; Robinson, Krysher, Haynes, & Edwards, 2010). To that end, challenges associated with time management and allocation have been reported for the last several decades (Goode & Stewart, 1981; Lockwood, 1976; Torres, Ulmer, & Aschenbrener, 2008; Warren & Flowers, 1993). "With the push for more comprehensive agriculture programs, increased student–to–teacher ratios and a high demand on accountability, instructor work–loads have become more time consuming" (Warren & Flowers, 1993, p. 69). On average, SBAE teachers work between 45 and 65 hours per week (Cole, 1981). As such, effective time management practices are essential (Warren & Flowers, 1993).

History, Philosophy, and Evolution of Supervised Agricultural Experience

Several researchers support the idea that Stimson's (1919) concept of the project method paved the way for SAE (Moore, 1988; Phipps et al., 2008). Prior to the introduction of this model, methods of delivering agricultural instruction were limited to lecture and physical labor on the school farm (Stimson, 1915; Stimson, 1919). In 1908, Rufus Stimson began his employment at the Smith's Agricultural School in Northampton, Massachusetts (Phipps et al., 2008). While working as the school director and farm operator, Stimson found the traditional teaching methods in place to be unsatisfactory, as limited quantities of supplies and equipment resulted in several students simply standing around watching while only a select few worked. As such, Stimson (1919) argued for a more hands-on approach to agricultural instruction, stating, "neither skill nor business ability can be learned from books alone, nor merely management of others. Both require active participation, during the learning period, in productive farming operations of real economic or commercial importance" (p. 32). Nevertheless, Stimson (1919) maintained that many schools lacked the ability and resources necessary to host all of their pedagogic practices on school property, and proposed that students utilize their own home farms, or others in local proximity, to further hone and acquire agricultural skills. This concept, regarded as the project method or home

project, along with Stimson's belief that schools should work to help students form connections between classroom concepts and real-life agricultural experiences, served as the basis for his philosophy of vocational education (Moore, 1988; Stimson, 1915, 1919).

To provide his students ample opportunity for skill acquisition and career preparation, Stimson (1919) assigned home projects which would provide students with pragmatic ways of applying classroom content. To augment student learning, these projects were designed to drive students to exercise a skill in an effort to achieve a certain result. Over the course of the four years students spent in vocational agriculture, Stimson (1919) required that they complete three different types of home projects. Improvement projects were assigned to provide students an experience relating to the maintenance of a farm facility (Stimson, 1919). Trial projects allowed students to sample new practices, plants, or animals in a production setting (Stimson, 1919). Third, students were assigned production projects to gain experience producing and marketing a certain crop (Stimson, 1919). Regardless of the project type, students were expected to document their project-related experiences by journaling about their progress and maintaining financial records (Stimson, 1919).

Stimson (1915) assigned and assessed home projects on the basis of associated risk, scope, and difficulty. To elaborate, young students in their first year of vocational agriculture were assigned the simpler home projects presenting minimal risk and difficulty, while older students undertook projects that increased in risk, scope, and difficulty each succeeding year. For instance, students in their first year of vocational agriculture were assigned basic plant projects like ornamental planting and kitchen gardening (Stimson, 1915). Students beginning their second year of instruction would move onto an animal husbandry home project, where they would be tasked with caring for small ruminants, like sheep and goats, or other small animals, such as poultry, swine, and bees (Stimson, 1915). After reaching their third year of vocational agriculture, students were assigned an advanced project in plant systems, which could include orcharding,

small-fruit cultivating, market gardening, or growing fruit and vegetables with the intent to sell (Stimson, 1915). When students reached their fourth and final year of instruction, they were responsible for advanced home projects in animal husbandry, dairy science, agricultural business, or farm management (Stimson, 1915). However, students were not limited to their assigned projects each year. Rather, they were encouraged to maintain their projects from previous years and received assistance with such through all four years of instruction (Stimson, 1915). Students were also encouraged to involve their families in the projects, as Stimson (1919) contended that this type of interaction would serve to expand the agricultural knowledge base of both parties.

With the passage of the Smith-Hughes Act of 1917, Stimson's home project method became a federal mandate, and all federally-funded, vocational programs were required to provide every student enrolled in agricultural education a minimum of six months of supervised practice in an agricultural setting each year (Camp et al., 2000; Stimson & Lathrop, 1942). Nearly one-half of a century later, the scope of Stimson's (1919) project method was broadened to include a greater variety of agricultural experiences through the passage of the Vocational Education Act of 1963 (Phipps et al., 2008). Specifically, the act declared:

> Any amounts allotted (or apportioned) under such titles, Act, or Acts for agriculture may be used for vocational education in any occupation involving knowledge and skills in agricultural subjects, whether or not such occupation involves work of the farm or of the farm home; and such education may be provided without directed or supervised practice on a farm. (Roberts, 1965, p. 580)

Although this legislation opened several doors for students with interests in more specific disciplines of agriculture like agricultural mechanics and horticulture, it eliminated the compulsory provision of supervised experiences, thus setting the stage for the steady decline in SAE participation that would emerge in the years to come (Phipps et al., 2008; Steele, 1997).

Since emerging as the project method, SBAE teachers have utilized SAE to provide students opportunities to apply the agricultural knowledge and skills they are taught in the classroom in individualized and real-life contexts (Dyer & Osborne, 1995; Dyer & Williams, 1997; Phipps et al., 2008; Talbert et al., 2007). As opposed to those experiences provided to students in laboratory settings, SAE is a unique component of the total SBAE program in that it allows students to employ what they have learned in individualized settings that they are able to control (Phipps et al., 2008). In addition to helping students put the knowledge and skills they have learned in class into practice, the subsequent realization of ownership often results in students forming favorable attitudes toward the process of learning. In essence, according to Phipps et al. (2008), SAEs function as the bridge which connects content and theory to experience and practice (see Figure 2).

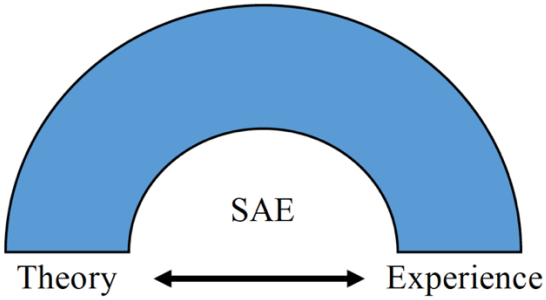

Figure 2. A conceptual model portraying SAE as the bridge which links theory to practice. Adapted from *Handbook on Agricultural Education in Public Schools* (p. 445), by L. J. Phipps, E. W. Osborne, J. E. Dyer, & A. L. Ball, 2008, Clift Park, NY: Thomson Delmar.

However, as time has progressed, so, too, has the scope of the agricultural industry. To keep up with the growing instructional demands of SBAE students and their new agricultural interests, SAE has been forced, and must continue, to evolve (Camp et al., 2000). SAE has endured several transformations since its initial conceptualization as the project method (Phipps et al., 2008). In an effort to broaden its pedagogic scope and reach through the years, SAE has

been referred to by several different names, including the Home-School Cooperation Plan in 1908, Farming Project in 1919, Productive Farm Enterprises in 1926, Supervised Farm Practice Program in 1938, Supervised Farming Program in 1943, Supervised Occupational Experience Program in 1972, and, as of 1992, Supervised Agricultural Experience Program (Phipps et al., 2008). Moreover, SAE categories have been expanded from the traditional areas of farm labor experience and crop and livestock production to include a broader scope of the agricultural industry (Phipps et al., 2008). Today, the present categories include placement, ownership/entrepreneurship, exploratory, research, service learning, and school-based enterprise (NCAE, 2015; Phipps et al., 2008).

Placement SAEs exist to provide students the opportunity to work in a paid or unpaid position in agricultural business, industry, and production venues, or in school laboratory settings (NCAE, 2015; Phipps et al., 2008). Ownership/entrepreneurship SAEs require an at-risk, financial investment, and provide students with opportunities to apply classroom concepts while maintaining a managerial role (Phipps et al., 2008). Students with ownership/entrepreneurship SAE projects are responsible for the maintenance of financial records, as well as the ownership of materials and inputs (NCAE, 2015). Through this type of SAE, students may gain the skills necessary to confidently establish their businesses or pursue employment (NCAE, 2015). In contrast, exploratory SAEs allow students to thoroughly investigate various careers and opportunities available through agriculture (Phipps et al., 2008). According to NCAE (2015), exploratory SAEs are meant to be individually conducted by students and should result in the development of a plan to pursue a new type of SAE. Students with research SAEs conduct research utilizing the scientific process to further or generate their agricultural knowledge through experimental or nonexperimental means (Phipps et al., 2008). Specifically, the three primary types of research SAEs are experimental, analytical, and invention (NCAE, 2015). Students with an experimental research SAE must plan and conduct their own experimental research study

(NCAE, 2015). The analytical research SAE requires students to analyze and investigate a chosen problem currently facing agriculture and natural resources without the use of an experimental design (NCAE, 2015). Rather, the student will collect and analyze data from an assortment of sources to produce a final product (NCAE, 2015). An invention SAE allows the student to conduct research on an identified need facing the agricultural industry to find a solution to a problem or increase industry efficiency through the development or adaptation of an agricultural product or service (NCAE, 2015).

In 2015, the NCAE recognized service learning and school-based enterprise as official SAE types. Specifically, NCAE (2015) defined the school-based enterprise SAE as a "student-managed, entrepreneurial operation in a school setting that provides goods or services that meet the needs of an identified market" (p. 3). This type of SAE can be a cooperative effort among students and is most conducive to learning when facilitated in an environment that effectively mimics an authentic workplace (NCAE, 2015).

A service learning SAE consists of "a student-managed service activity where students are involved in the development of a needs assessment, planning the goals, objectives and budget, implementation of the activity, promotion, and evaluation/reflection of a chosen project" (NCAE, 2015, p. 3). These service activities may be conducted cooperatively or independently, and can be held on behalf of schools, local organizations within the community, non-profit organizations, or religious entities (NCAE, 2015). Any funds necessary for the project to take place must be raised by the students, and for the activity to be considered a true service learning SAE, it must be a free-standing service venture with no ties to preexisting chapter or community fundraisers and projects (NCAE, 2015).

Despite these efforts to broaden the scope and reach of SAE programs, participation and implementation have continued to decline (Croom, 2008; Dyer & Osborne, 1995; Moore, 1979;

Lewis, Rayfield, & Moore, 2012a; Osborne, 1988; Retallick & Martin, 2005; Retallick & Martin, 2008; Steele, 1997; Wilson & Moore, 2007). Relatively low numbers indicative of SAE participation have been reported for the last several decades. In an early 1980s study conducted by Miller (1980), SBAE teachers in North Carolina projected that less than 60% of the students enrolled in their programs would develop a SAE. Five years later, Penrod (1985) found that less than one-third of all SBAE students in New York maintained SAE programs. This decrease in participation continued, as Arrington (1985) reported that fewer than 50% of all SBAE students in Florida maintained a SAE program during their entire high school career. Further, according to Leising and Zilbert (1985), over 40% of all SBAE students in California were found to have no SAE program.

This trend of declining SAE participation and implementation persisted into the 1990s and 2000s. Between the years of 1983 and 1997, SAE participation among SBAE programs in New York fell by 10% (Steele, 1997). Similarly, despite an increase in SBAE program enrollment, Retallick and Martin (2008) also observed a decrease in SAE participation among SBAE students in Iowa. Concerning the states of Florida, Indiana, Missouri, and Utah, Lewis et al. (2012a) found that less than one-half of all students enrolled in SBAE had viable SAE programs.

The literature suggests the aforementioned decrease in SAE participation and implementation may be a result of barriers perceived by SBAE teachers and students. Barriers to teacher implementation and student participation identified by researchers have included time constraints, challenges presented by the practice of record keeping, school structure, insufficient experience with or knowledge of the new types of SAEs, image, limited opportunities within the community, shifting demographics and attitudes within society, and excessive numbers of students (Blackburn & Ramsey, 2014; Foster, 1986; Retallick, 2010; Wilson & Moore, 2007). Moreover, “there is a paradox between the value teachers place on SAE and the manner in which

SAE is being implemented" (Wilson & Moore, 2007, p. 89). Despite agreeing on the importance of SAE in providing students a comprehensive education, teachers are not effectively implementing the practice in their own programs (Wilson & Moore, 2007).

Record Keeping of Supervised Agricultural Experience

Researchers have indicated that SBAE teachers consider SAE to be a critical component of agricultural education (Wilson & Moore, 2007). In fact, many SBAE teachers agree that SAE should be a mandatory requirement of all students enrolled in the program (Croom, 2008; Moore, 1979). However, a steady decrease in SAE participation has been documented for nearly four decades (Croom, 2008; Dyer & Osborne, 1995; Lewis et al., 2012a; Moore, 1979; Osborne, 1988; Retallick & Martin, 2005; Retallick & Martin, 2008; Steele, 1997). Although research has presented several different impediments to SAE participation, challenges linked to record keeping have emerged in multiple studies (Foster, 1986; Layfield & Dobbins, 2002; Miller & Scheid, 1984; Pfister, 1983; Wilson & Moore, 2007).

The practice of record keeping allows students to document all aspects of their SAE programs (Newcomb et al., 1993; Talbert et al., 2007). Because these records function as the foundation of several FFA degree and award applications, it is critical that students receive instruction on how to maintain and manage accurate records (Talbert et al., 2007). As such, SBAE teachers should make an effort to become acquainted with their record keeping systems in order to develop and deliver lessons that will be conducive to student understanding of the practice (Talbert et al., 2007). In addition to equipping students with a new skill, providing instruction on proper record keeping techniques will also allow students to better prepare their records for advanced degree and award applications (Talbert et al., 2007).

Though the specific records required may vary by state FFA association or school, student records generally include the following items:

- Student name and chapter;
- Year in agriculture;
- Period covered;
- Teacher's name;
- List of enterprises;
- Budgets;
- Accounts receivable;
- Accounts payable;
- Income;
- Expenses;
- Inventories;
- Financial statements; and
- Income summary. (Talbert et al., 2007, pp. 433-434)

In addition to the records maintained by each individual student, SBAE teachers should maintain their own records pertaining to four areas:

1. Individual student supervised experience agreements and training plans;
2. Individual student records of kind, size, growth, and performance;
3. Information on visitations, including dates, contacts, mileage, and major observations;
4. School-wide summarization of student supervised experiences by kind and scope. (Talbert et al., 2007, p. 434)

Record keeping has been recognized as an essential facet of SAE (Boone, 2010; Camp et al., 2000; Davis & Williams, 1979; Ford et al., 2012; Jenkins & Kitchell, 2009; Moore, 1979; Phipps et al., 2008; Rubenstein & Thoron, 2014). Researchers have identified maintenance of up-to-date records as a SAE program (SAEP) quality indicator (Camp et al., 2000; Jenkins &

Kitchell, 2009). In a qualitative study conducted by Rubenstein and Thoron (2014), 2012 FFA American Degree Star Finalists attributed part of their success to keeping accurate and up-to-date records. According to Ford et al. (2012), "quality records equate to quality supervised agricultural experiences" (p. 24). However, teachers often place greater emphasis on the procedures associated with record keeping than on the actual purpose of the practice (Davis & Williams, 1979). Ideally, record keeping should be taught and viewed as a valuable learning experience that prepares students for the workplace (Davis & Williams, 1979). It has also been recommended that SBAE teachers establish a consistent record keeping routine for the purpose of fostering student accountability (Moore, 1979). According to Davis and Williams (1979), record keeping provides students a systematic platform to document the plans, progress, and results of their SAEs. To ensure that students are recognizing their SAEs as meaningful experiences, Boone (2010) contended that all students with SAEs should be required to document and reflect on these experiences through record keeping practices.

According to McComas (1962), both school administrators and SBAE teachers expressed that it should be the responsibility of the teacher to help students keep accurate SAE records. One means through which SBAE teachers can ensure students maintain accurate records is through the provision of formal, routine assessments. Moore (1979) recommended the consistent collection and evaluation of students' record books. In agreement with Moore (1979), Phipps et al. (2008) offered four guidelines for evaluating students' SAE records:

- Review the student's records for accuracy, project quality, and program growth. Complete an annual assessment of the student's progress.
- Prepare a list of questions to ask the student, and, based upon the student's responses, determine the changes or adaptations that need to be made in the future to improve the student's learning opportunities.
- Discuss plans for improving and/or expanding the student's SAE program.

- Identify appropriate FFA proficiency awards and degrees for which the student should apply, and encourage the student to complete the appropriate application forms. (pp. 473-474)

In addition to serving as an incentive for students to maintain high quality, accurate records, collecting record books for a grade also poses positive implications for SAE and record keeping participation. According to Lewis, Rayfield, and Moore (2012b), "it is safe to assume that if more teachers assigned a grade value to SAE programs and record books, more students would be encouraged to participate due to the course requirement" (p. 79).

Despite documentation of its importance, record keeping appears to pose a challenge for SBAE teachers and students alike. According to Miller and Scheid (1984), SBAE teachers identified record keeping as one of the most challenging activities associated with instructing SAEs. Similarly, Wilson and Moore (2007) found record keeping to be an impediment to SAE implementation, as SBAE teachers consider the practice to be excessively complicated. In a quantitative study conducted by Layfield and Dobbins (2002), experienced SBAE teachers in South Carolina considered teaching record keeping skills to be one of their primary competency needs for in-service training. Pre-service SBAE teachers appear to struggle with record keeping as well, as Pfister (1983) reported record books to be one of the greatest challenges for student teachers. In addition, Foster (1986) identified students' dislike for keeping records as a leading deterrent to SAE participation.

Regardless of its challenges, the practice of record keeping is essential to the success of any SAE program (Phipps et al., 2008). As time has progressed, computer-based technology has begun to pose several implications for education and society alike (Mueller, Wood, Willoughby, Ross, & Specht, 2008). Today, nearly all businesses are utilizing computers to maintain records (Phipps et al., 2008). Therefore, "if students are expected to buy into the concept that SAE

programs prepare them for careers in agriculture, teachers should make every attempt to modernize the means by which students track their financial, professional, and personal records" (Phipps et al., 2008, p. 473).

Computer Integration in School-Based Agricultural Education

According to Mueller et al. (2008), the extraordinary rate at which computer technology has advanced throughout society is still on the ascent. As computers and Internet access continue to grow increasingly more available, computer-based technology is well on its way to becoming a staple in schools across the country (Mueller et al., 2008). However, the rapid and ever-changing nature of technology has raised questions about the role it should play in schools (Bailey, 1997; Budin, 1999). Nevertheless, members of the SBAE profession still appear to recognize the importance of technology integration. As stated by Kotrlik, Redmann, and Douglas (2003), "if agriscience education programs are going to provide the best education possible, they must integrate technology in the process" (p. 88). However, researchers have indicated that this technology is often both underestimated and underutilized by teachers (Alston, Miller, & Williams, 2003; Kotrlik et al., 2003; Kotrlik & Redmann, 2009; Muir-Herzig, 2004). According to Alston et al. (2003), despite having sufficient access to computers, SBAE teachers in North Carolina and Virginia were not exercising them to their full potential.

Shortly after making its classroom debut in the early 1980s, the microcomputer began to surface in numerous works of agricultural education research (Becker & Shoup, 1985; Church & Foster, 1984; Henderson, 1985; Miller & Foster, 1985; Miller & Kotrlik, 1986; Raven & Welton, 1989; Rohrbach & Stewart, 1986; Zidon & Luft, 1986). According to Miller and Kotrlik (1986), SBAE teachers initially relied on computers as more of an instructional management tool than a means for delivering instruction. Some early, non-instructional uses of computers by SBAE teachers included grading, record keeping, preparation of instructional materials, test-making, and

correspondence (Henderson, 1985; Raven & Welton, 1989; Zidon & Luft, 1986). Instructional units which frequently featured the use of computers included farm business management, SAE, and animal science (Raven & Welton, 1989; Zidon & Luft, 1986). After performing a study on the use of computers in SBAE programs in Kansas, Raven and Welton (1989) found agricultural software programs to be the most frequently used and readily available type of software. More specifically, in a quantitative study exploring the perceived value of selected computer programs by SBAE teachers in Washington, Oregon, and Idaho, Church and Foster (1984) found that teachers regarded financial analysis, budgeting, and record keeping programs as high in value.

Frequently reported barriers to teachers' use and implementation of computers and other related technologies have included insufficient funding (Henderson, 1985; Miller & Foster, 1985; Raven & Welton, 1989), knowledge (Miller & Foster, 1985; Raven & Welton, 1989), time (An & Reigeluth, 2011; Brickner, 1995; Coley, Warner, Stair, Flowers, & Croom, 2015; Henderson, 1985; Kotrlik & Redmann, 2009; Raven & Welton, 1989; Williams, Warner, Flowers, & Croom, 2014), credibility (Li, 2004; Saisi, 2011), and resources (Brickner, 1995; Coley et al., 2015; Williams et al., 2014). Further, though not explicitly documented as a barrier, a moderate degree of technology anxiety has been recognized among teachers within the SBAE profession (Fletcher & Deeds, 1994; Kotrlik & Redmann, 2009; Kotrlik et al., 2003; Kotrlik & Smith, 1989).

In more recent times, computers have evolved into one of the most prevalent technological mediums found in schools. According to the U.S. Department of Education National Center for Education Statistics, 100% of all public schools surveyed in 2008 had at least one computer with access to the Internet (Gray, Thomas, & Lewis, 2010). In addition, 97% of public schools were found to have computers in their classrooms for instructional purposes, and 58% of public schools had laptop computer carts (Gray, Thomas, & Lewis, 2010). More specific to the discipline of SBAE, Tennessee teachers reported desktop computers to be their most frequently used teacher-based technology (Coley et al., 2015). According to Kotrlik, Redmann,

Harrison, and Handley (2000), 79% of the Louisiana SBAE teachers featured in their study reported having at least one computer available to them in their office or classroom. Similarly, as reported by Williams et al. (2014), most North Carolina SBAE teachers surveyed had access to computers in their classrooms or elsewhere in their schools, and facilitated the student use of these computers several times throughout the school year. However, while computers and the Internet appear to be fairly accessible in public schools, the same cannot be said for the homes of the teachers and students who populate them. According to the U.S. Department of Commerce, National Telecommunications and Information Administration (2011), approximately 40% of households yet to adopt the Internet are located in rural communities, with several of these individuals citing inadequate access to high-speed Internet as the cause.

Classroom environments and instructional practices are not the only facets of education impacted by the integration of computers. Over the last few decades, the SBAE profession has been steadily making its way into the digital era. With the influx of technology that came at the start of the 1980s, so, too, came a new generation of students (Bennett, Maton, & Kervin, 2008). Digital natives are those individuals born after 1980 (Bennett et al., 2008; Carlacio & Heidig, 2011). Having never known a world without computers or other similar means of technology, digital natives are likely to perceive technological innovations such as "computer games, e-mail, cell phones and instant messaging [as] integral parts of their lives" (Prensky, 2001, p. 1). In contrast, digital immigrants are those individuals born prior to the surge of technology beginning in 1980 (Bennett et al., 2008; Prensky, 2001). Despite having lived without digital technology prior to its arrival, digital immigrants also appear to have become enthralled with such technological innovations (Prensky, 2001). According to Prensky (2001),

> as Digital Immigrants learn – like all immigrants, some better than others – to adapt to their environment, they always retain, to some degree, their "accent," that is their foot in the past. The "digital immigrant accent" can be seen in such things as turning to the

> Internet for information second rather than first, or in reading the manual for a program rather than assuming that the program itself will teach us to use it. Today's older folk were "socialized" differently from their kids, and are now in the process of learning a new language. And a language learned later in life, scientists tell us, goes into a different part of the brain. (Prensky, 2001, p. 3)

The disparity of technological experience between digital natives and digital immigrants has the potential to pose unique implications for education. According to Prensky (2001), "the single biggest problem facing education today is that our Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language" (p. 3).

The literature suggests that SBAE teachers have recognized this technological dissonance among the generations and are making concentrated efforts to bridge the gap that separates them from their digital native students (DeShazo et al., 2003; Phipps et al., 2008). This effort is especially evident when examining the transition from pen-and-paper record books to computer-based SAE record keeping systems.

Electronic Means of Supervised Agricultural Experience Record Keeping

The literature suggests that SBAE students and teachers began using computers for keeping SAE records as early as the mid 1980s (Church & Foster, 1984; Henderson, 1985). According to DeShazo et al. (2003), the turn-of-the-century emergence of electronic record keeping can most likely be attributed to ideas stimulated by the initial release of the Local Program Resource Guide CD-ROM as part of a joint initiative among the NCAE, United States Department of Education (USDE), National FFA Organization, and National Association for Agricultural Education (NAAE). "From those sound roots have grown eEfforts by State FFA Associations, corporate vendors, private individuals, and curriculum centers to deliver the

electronic assists for SAEs in an efficient and effective manner" (DeShazo et al., 2003). Specifically, DeShazo et al. (2003) identified CD-ROMS, software packages, Microsoft Excel templates, and web-based systems as some of the innovative vehicles fashioned for SAE record keeping in the early 2000s.

Several individuals within the SBAE profession appear to be in favor of computer-based methods of SAE record keeping. According to Anderson and Williams (2012), SBAE teachers surveyed in Texas exhibited favorable attitudes toward computer-based record keeping systems. In addition, Phipps et al. (2008) contended that teachers should modernize the means by which their students maintain SAE records by adopting a computer-based system. To accomplish this, Phipps et al. (2008) offered six suggestions:

1. Discuss with the class the importance of good records and the necessity of records being complete and accurate if they are to be of any value.
2. Secure the cooperation of parents, employers, and other supervisors.
3. Discuss with students the records they should keep on their SAE projects and programs, and establish a computer or online record-keeping system that meets students' needs.
4. Provide practice so that the students may develop the ability to easily perform the mechanics of record keeping. Set aside a day each week when students enter data into their record-keeping system. This can be done during directed study periods, but the teacher must supervise each student.
5. Keep a copy of each student's electronic records in a location at school that is readily accessible to both the students and the teacher. For students who do not have access to a computer, allow students to keep records in hand-copy format to be entered into the computer when classes resume.
6. Have students make summaries and conduct proper analyses of records both during and at the completion of each project. (p. 465)

Moreover, DeShazo et al. (2003) posited several advantages to adopting an electronic, web-based record keeping system. Specifically, web-based record keeping systems (a) are adaptable for every type of SAE, (b) allow students to save money and time, (c) do not require computer hard drive space, (d) make efficient use of school and personal computers, (e) update automatically without service interruption, (f) are secure and password protected, (g) serve as an extended form of supervision, (h) decrease the time it takes teachers to review students' SAE records, (i) are delivered electronically and available for use instantly, (j) can be used to facilitate paperless, take-home assignments, (k) allow teachers, parents, and other authorized persons to view student records, (l) can reduce the time teachers spend driving to remote locations by allowing them to monitor or converse with students from a distance, (m) allow teachers to supervise and assess student records from any place at any time, (n) allow teachers and students to communicate with technical support personnel by electronic mail, and (o) expose students and teachers to modern technology (DeShazo et al., 2003).

Microsoft Excel Templates

By 2001, the National FFA Organization developed and released a variety of Microsoft Excel templates intended for SAE supervision and record keeping practices (National FFA Organization, 2016). Individual templates were created for SAE plans, agreements, student journals, on-site evaluations, visitations, supervision reports, documentation forms, contact reports, quality rating sheets, and jobsite surveys (National FFA Organization, 2016). Despite having access to these resources, some SBAE teachers opted to create templates of their own, and even began marketing them to other teachers and programs within the profession (FFA Record Book Pro, 2016; NCAE, 2002). Although the popularity and availability of Excel-based record keeping systems would appear to have lessened over time, several state FFA associations still offer downloadable record book templates online (California Agricultural Education, 2016; Iowa FFA Association, 2016; Minnesota FFA Association, 2016).

EZ Records

Initially released in 2002 as a software program developed by Information Technology and Communication Services (ITCS) Instructional Materials, "EZ Records is a supervised agricultural experience (SAE) record-keeping system designed to keep SAE program records, FFA participation, leadership activities, skills learned, and enterprise efficiencies" (EZ Records, 2017a, para. 3). Eleven years after the Illinois Association of Vocational Agriculture Teachers (IAVAT) agreed that a computer-based record book should be created for SBAE programs in Illinois, ITCS Instructional Materials received a grant to develop the program (EZ Records, 2017a). In 2005, the program was redeveloped to be completely Internet-based (EZ Records, 2017a). EZ Records is still fully operational, and one-year subscriptions are currently available for purchase at the price of $6.00 per student (EZ Records, 2017b).

MyAgRecord

Not long after the arrival of EZ Records, Instructional Materials Service (IMS) developed and launched MyAgRecord, a completely web-based record keeping system (Ermis & Dillingham, 2002). Prior to its digital release, a committee of Texas Education Agency (TEA) staff members and SBAE teachers came together to modify the content of the record book to better align with the General Accepted Accounting Principles (GAAP) and Farm Financial System (FFS) (Ermis & Dillingham, 2002). It was also revised to include the data required for student completion of the American FFA Degree application (Ermis & Dillingham, 2002). Following the completion of the revisions made to the record book content, IMS recruited the Texas Engineering Extension Service (TEEX) to develop a prototype of the web-based system to pilot test in 2001 (Ermis & Dillingham, 2002). The system was pilot tested in the spring of 2001, and a fully operational version of MyAgRecord was released for SBAE student and teacher use during the next school year (Ermis & Dillingham, 2002). In 2002, the system was updated to

allow students and teachers to produce completed FFA degree applications from the records already entered in students' MyAgRecord books (Ermis & Dillingham, 2002).

The Agricultural Experience Tracker

Having not been released until 2007, The Agricultural Experience Tracker (the AET) is a relatively new, web-based SAE record keeping system (R. D. Hanagriff, personal communication, February 8, 2016). New as the system may be, several states, including Oklahoma, have adopted the AET as their official SAE record keeping system (R. D. Hanagriff, personal communication, February 8, 2016). Designed to replace the practice of traditional pen-and-paper SAE record keeping while rivaling comparable systems,

> The Agricultural Experience Tracker is the premiere personalized online system for tracking experiences in agricultural education. Like other systems, the AET summarizes those experiences into standard FFA award applications. The AET can also aggregate those experiences across programs to produce local reports for school administrators and overall economic impact reports for interested stakeholders and legislative representatives. (The Agricultural Experience Tracker, 2017a, Welcome section, para. 1)

Similar to EZ Records, annual subscriptions for the AET are available for purchase. However, these subscriptions may not be purchased by individual students (The Agricultural Experience Tracker, 2017b). Rather, the SBAE program must purchase the subscriptions according to the pricing structure established by the provider (The Agricultural Experience Tracker, 2017b). This pricing structure is based on unduplicated, program enrollment and is comprised of five levels. Level one subscriptions may be purchased by SBAE programs with no more than 40 students for $150.00. Level two subscriptions are available to SBAE programs with 41 to 120 students for $265.00. Level three subscriptions may be purchased for $385.00 by SBAE programs with 121 to 200 students. Level four subscriptions are available to SBAE programs with student numbers

ranging from 201 to 300 for an annual price of $500.00. Finally, level five subscriptions may be purchased by SBAE programs with more than 300 students for $650.00 (The Agricultural Experience Tracker, 2017b).

Diffusion and Adoption of The Agricultural Experience Tracker

After its entry into the marketplace, the AET commenced its diffusion throughout a number of states. Today, the web-based system boasts a presence in 46 states with more than 850,000 active student accounts (The Agricultural Experience Tracker, 2017a). In addition, the National FFA Organization officially adopted the AET's degree and award application manager and program of activities (POA) calendar (National FFA Organization, 2013). As such, SBAE teachers are beginning to recognize the need to become proficient navigators of the system. In a Texas study presented at the 2015 American Association of Agricultural Education's (AAAE) Western Region Conference, 94.1% of SBAE teachers surveyed agreed that knowledge of the AET record book system should be considered an essential skill related to their professional roles (Davidson, Burris, Ulmer, & Fraze, 2015). In the same study, 88.2% of participants agreed that the ability to teach students about the AET record book system should be considered an essential skill related to the role of a SBAE teacher. In a study conducted by Sorensen, Lambert, and McKim (2014), all responding SBAE teachers in Oregon found utilizing the AET record book system to be their greatest in-service need. Moreover, in his dissertation study, Rank (2016) found 65.91% of participating teacher-education programs used the AET to provide SAE record keeping instruction to pre-service teachers.

Having recognized the AET's surge in prevalence, the Agricultural Education Division of CareerTech made an authority innovation-decision to adopt the AET as the official SAE record keeping system of Oklahoma (J. Staats, personal communication, December 1, 2015). However, with the approval of House Bill (HB) 3006 in April of 2014, this authority-innovation decision

became a mandate for adoption. Because HB 3006 required every student enrolled in SBAE to maintain a SAE, SBAE programs in Oklahoma were now encouraged to provide documentation of students' SAEs using the AET.

Since the beginning of the 2014-2015 school year, the Agricultural Education Division of CareerTech has purchased annual subscriptions from the AET for every SBAE program in Oklahoma (R. Bonjour, personal communication, April 13, 2017). Initially, with the exception of those graduating in the spring of 2015, all SBAE students in Oklahoma were required to begin using the AET (R. Bonjour, personal communication, April 13, 2017). All first-year, SBAE students were expected to have records on the AET by January 1, 2015, while sophomores and juniors were given until December, 31, 2015 to transfer their preexisting records to the new medium (R. Bonjour, personal communication, April 13, 2017). However, on December 2, 2014, the Agricultural Education Division of CareerTech made an executive decision to allow all students with preexisting SAE records to choose between use of the AET or Excel templates through the duration of their SBAE careers (R. Bonjour, personal communication, April 13, 2017). The students graduating in the spring of 2017 will be the last to have this option, and every SBAE student in Oklahoma will be expected to have records on the AET in the 2017-2018 school year (R. Bonjour, personal communication, April 13, 2017).

In the summer of 2014, all SBAE teachers in Oklahoma were required to attend one of five, six-hour, in-service training sessions regarding the AET (R. Bonjour, personal communication, April 13, 2017). In the same summer, teachers were invited to attend another in-service training workshop featuring Dr. Roger Hanagriff, developer of the AET (R. Bonjour, personal communication, April 13, 2017). Additional opportunities for in-service training regarding the AET were made available in the summer months of 2015 and 2016 (R. Bonjour, personal communication, April 13, 2017).

Though limited, recent research pertaining to the AET suggests the innovation is beginning to gain traction within the agricultural education profession (Davidson et al., 2015; Rank, 2016; Sorensen et al., 2014). Although the literature is scant in regard to the AET, it is even more so lacking in the area of its diffusion. At this time, no formal research regarding diffusion or adoption of the AET exists. Therefore, to address this paucity in the literature, the researcher selected Rogers' (2003) diffusion of innovations theory as the theoretical framework for this study.

Theoretical Framework

This study was framed by Rogers' (2003) diffusion of innovations theory. "Diffusion is the process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p. 5). For the purpose of this study, the AET was contextualized as the innovation of interest, and the social system included all SBAE teachers in Oklahoma. By studying this phenomenon through the lens of Rogers' (2003) theory, voice may be given to how this innovation is being adopted and perceived by members of the Oklahoma SBAE social system.

According to Rogers (2003), new ideas and innovations generally elicit feelings of uncertainty among the potential adopters of a given social system. However, the *innovation-decision process* provides potential adopters a means to reduce this uncertainty through five distinct stages: (a) knowledge, (b) persuasion, (c), decision, (d) implementation, and (e) confirmation (Rogers, 2003). Specifically, Rogers (2003) described the innovation-decision process as the procedure through which an individual or group decision-making entity acquires fundamental knowledge about an innovation, forms an attitude about it, decides to adopt or reject it, puts the decision into practice, and confirms the decision in one of two ways. After reaching the confirmation stage of the innovation-decision process, an individual will confirm his or her

decision to adopt the innovation by either continuing or discontinuing adoption (Rogers, 2003). Conversely, if an individual made the initial decision to reject the innovation, he or she may confirm that decision through sustained rejection or delayed adoption (see Figure 3).

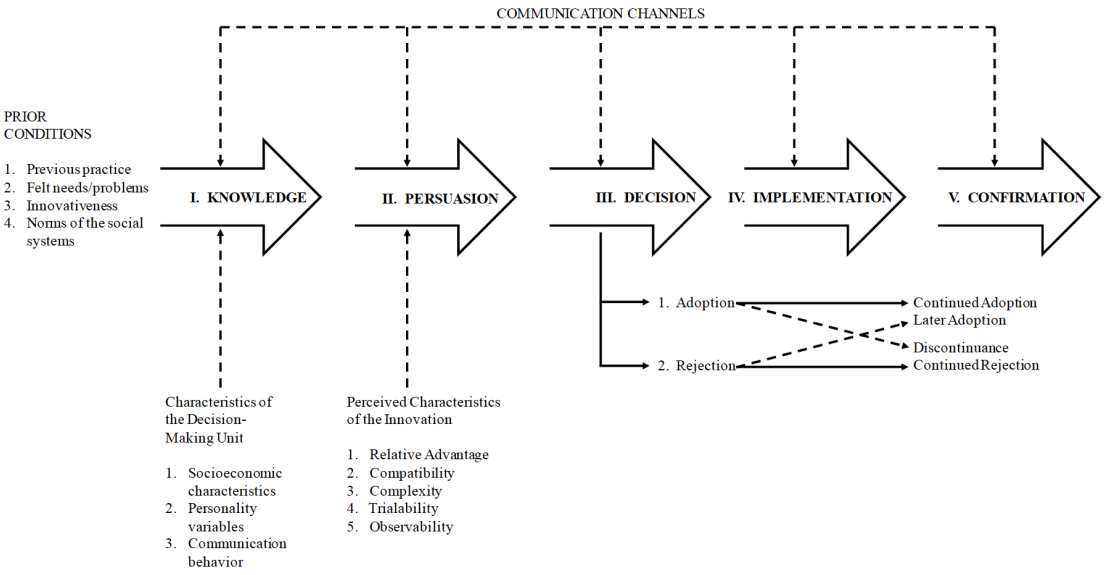

Figure 3. Rogers' (2003) Model of the Innovation-Decision Process. Adapted from *Diffusion of Innovations* (p. 170), by E. M. Rogers, 2003, New York, NY: The Free Press.

Rogers (2003) described three types of knowledge concerning an innovation. The first type is *awareness-knowledge*, which makes the existence of an innovation known to an individual (Rogers, 2003). The acquisition of this type of knowledge can often stimulate an individual to pursue the other two types of knowledge, *how-to knowledge* and *principles-knowledge* (Rogers, 2003). "Such information seeking is concentrated at the knowledge stage of the innovation-decision process, but it may also occur at the persuasion and decision stages" (Rogers, 2003, p. 173). How-to knowledge is required to properly utilize an innovation, whereas principles-knowledge is needed to understand how an innovation functions. According to Rogers (2003), "when an adequate level of how-to knowledge is not obtained, rejection and discontinuance are likely to result" (p. 173). Further, even though individuals may adopt an innovation without

having a sufficient degree of principles-knowledge, this can result in the innovation being misused, or in the discontinuance of its adoption (Rogers, 2003). What is more, individuals lacking principles-knowledge also lack the competence to judge the innovation's effectiveness (Rogers, 2003).

Rogers' (2003) Five Perceived Attributes of Innovations

During the persuasion stage of the innovation-decision process, individuals develop favorable or unfavorable attitudes toward an innovation based primarily on five attributes (Rogers, 2003). Specifically, "these five attributes of innovations are (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability" (Rogers, 2003, p. 223). According to Rogers (2003), how individuals perceive an innovation on the basis of these attributes will predict the rate at which the innovation is adopted.

Rogers (2003) described *relative advantage*, the first mentioned attribute, as "the degree to which an innovation is perceived as being better than the idea it supersedes" (p. 229). SBAE teachers in Oklahoma may or may not recognize the AET as being a more advantageous practice than traditional pen-and-paper record keeping methods. Despite conceptual differences, some diffusion researchers believe relative advantage and compatibility are comparable (Sahin, 2006). However, Rogers (2003) defined *compatibility* as "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (p. 240). When an individual perceives an innovation as being compatible with their particular needs, uncertainty subsides and the rate of adoption accelerates (Rogers, 2003). As such, SBAE teachers in Oklahoma with positive perceptions of the AET on the basis of compatibility would be more likely to adopt it than those with conflicting experiences, needs, or views.

Complexity refers to "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers, 2003, p. 257). According to Rogers (2003), unlike

relative advantage and compatibility, complexity maintains a negative relationship with rate of adoption, making it a potential impediment to adoption. “In the case of innovations that are relatively complex, the amount of how-to knowledge needed for adoption is much greater than in the case of less complex ideas” (Rogers, 2003, p. 173). If SBAE teachers in Oklahoma perceived the use and navigation of the AET to be too complicated, they would be less likely to adopt it.

Trialability and observability, however, are positively correlated to an innovation’s rate of adoption (Rogers, 2003). *Trialability* is defined as “the degree to which an innovation may be experimented with on a limited basis” (Rogers, 2003, p. 258). As potential adopters, when SBAE programs in Oklahoma are provided greater opportunity for exposure to the AET, its rate of adoption may be hastened. Further, Rogers (2003) described *observability* as “the degree to which the results of an innovation are visible to others” (p. 258). Essentially, the more obvious its results are, especially if viewed positively, the more quickly the AET will be adopted by SBAE programs in Oklahoma.

Rogers’ (2003) Model of Adopter Categorization

In an effort to better recognize and predict the characteristics of those who choose to adopt an innovation and those who do not, Rogers (2003) proposed a method of adopter categorization based on innovativeness (see Figure 4). Specifically, Rogers’ (2003) five adopter categories are “(1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards” (p. 22). Rogers (2003) defined *innovativeness*, the primary criterion for categorization, as “the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system” (p. 280). However, because adoption of the AET was mandated among the entire social system, the innovation was essentially adopted by every SBAE program in Oklahoma at the same time. As such, for the purpose of this study,

innovativeness was operationalized as the degree to which each SBAE program in Oklahoma utilized selected features of the AET in 2015.

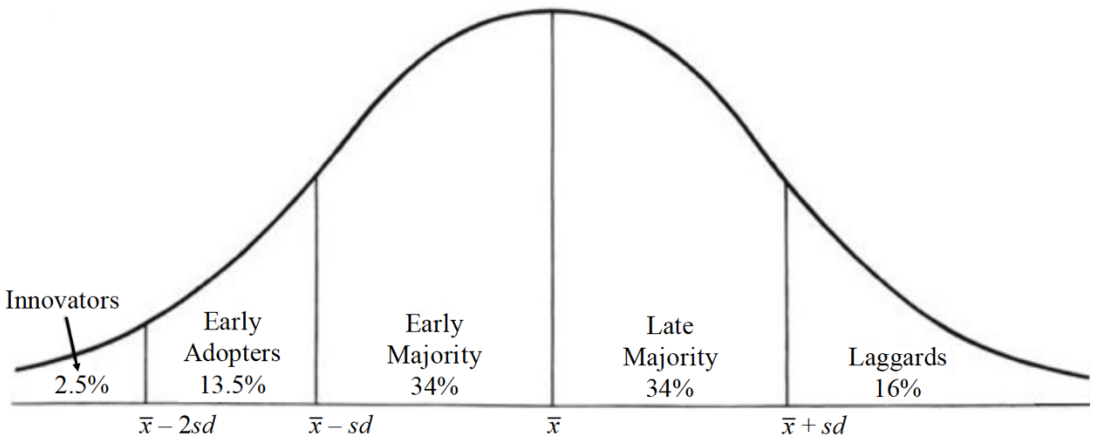

Figure 4. Rogers' (2003) Model of Adopter Categorization. Adapted from *Diffusion of Innovations* (p. 281), by E. M. Rogers, 2003, New York, NY: The Free Press.

To elaborate on each individual adopter category, Rogers (2003) depicted the *innovators* as being "venturesome" (p. 282) and open to new ideas and experiences. Described as the category holding the greatest magnitude of *opinion leadership*, *early adopters* generally hold the respect of their peers (Rogers, 2003). When early adopters choose to adopt an innovation, uncertainty regarding the innovation decreases among other potential adopters (Rogers, 2003). Though generally lacking in the area of opinion leadership, those in the *early majority* serve as a major tie for communication between the earlier and later adopters (Rogers, 2003). As one of the two largest categories, the early majority makes up about one-third of all potential adopters in a social system (Rogers, 2003). They are characterized as being very deliberate decision-makers, and are neither the first nor the last to adopt an innovation (Rogers, 2003).

Similar to the early majority, the *late majority* also accounts for approximately one-third of all potential adopters in a social system (Rogers, 2003). Members of the late majority are often

skeptical about adopting a new innovation until they succumb to peer or economic pressures (Rogers, 2003). The *laggards*, the last members of any social system to adopt a new innovation, hold tightly to traditions and are suspicious of change (Rogers, 2003). Because this mistrust generally stems from financial insecurity and a limitation of resources, Rogers (2003) maintained that laggards must be absolutely sure that the innovation in question will not disappoint. As a result, laggards require a fairly drawn-out innovation-decision process (Rogers, 2003).

Following this method of categorization, Rogers (2003) further organized each category into one of two distinct groups: the *earlier adopters* and the *later adopters*. The innovator, early adopter, and early majority categories make up the earlier adopters, and the late majority and laggard categories comprise the later adopters (Rogers, 2003). According to Rogers (2003), previous research has illuminated "many important differences between earlier and later adopters of innovations in (1) socioeconomic status, (2) personality variables, and (3) communication behavior" (p. 299). Beginning with differences pertaining to socioeconomic status, Rogers (2003) offered six generalizations:

- "Earlier adopters are no different from later adopters in age" (p. 288).
- "Earlier adopters have more years of formal education than do later adopters" (p. 288).
- "Earlier adopters are more likely to be literate than are later adopters" (p. 288).
- "Earlier adopters have higher social status than do later adopters" (p. 288).
- "Earlier adopters have a greater degree of upward social mobility than do later adopters" (p. 288).
- "Earlier adopters have larger-sized units (farms, schools, companies, and so on) than do later adopters" (p. 288).

As for differences in personality variables, Rogers (2003) contended:

- "Earlier adopters have greater empathy than do later adopters" (p. 289).

- "Earlier adopters may be less dogmatic than are later adopters" (p. 289).
- "Earlier adopters have a greater ability to deal with abstractions than do later adopters" (p. 289).
- "Earlier adopters have greater rationality than do later adopters" (p. 289).
- "Earlier adopters have more intelligence than do later adopters" (p. 289).
- "Earlier adopters have a more favorable attitude toward change than do later adopters" (p. 290).
- "Earlier adopters are better able to cope with uncertainty and risk than are later adopters" (p. 290).
- "Earlier adopters have a more favorable attitude toward science than do later adopters" (p. 290).
- "Earlier adopters are less fatalistic than are later adopters" (p. 290).
- "Earlier adopters have higher aspirations (for formal education, higher status, occupations, and so on) than do later adopters" (p. 290).

Finally, concerning differences in communication behavior, Rogers (2003) offered nine generalizations:

- "Earlier adopters have more social participation than do later adopters" (p. 290).
- "Earlier adopters are more highly interconnected through interpersonal networks in their social system than are later adopters" (p. 290).
- "Earlier adopters are more cosmopolite than are later adopters" (p. 290).
- "Earlier adopters have more contact with change agents than do later adopters" (p. 291).
- "Earlier adopters have greater exposure to mass media communication channels than do later adopters" (p. 291).

- "Earlier adopters have greater exposure to interpersonal communication channels than do later adopters" (p. 291).
- "Earlier adopters seek information about innovations more actively than do later adopters" (p. 291).
- "Earlier adopters have greater knowledge of innovations than do later adopters" (p. 291).
- "Earlier adopters have a higher degree of opinion leadership than do later adopters" (p. 291).

The adopter category generalizations have not been thoroughly investigated within this study's social system of interest. However, in a recent study regarding the diffusion of interactive whiteboards among SBAE teachers in Oklahoma, Bunch, Robinson, and Edwards (2015) found a significant, negative relationship between the age, experience, and perceived innovativeness of participating SBAE teachers. In contrast with Rogers' (2003) generalization about age, Bunch et al. (2015) concluded that younger, less experienced SBAE teachers in Oklahoma were further along in the innovation-decision process than their older, more experienced counterparts.

Mandated Adoption Decisions

Rogers (2003) contended that a governing body can influence the adoption decisions of individuals within a social system by offering incentives. More specifically, providing incentives for the adoption of an innovation can increase the rate at which the innovation is adopted, as well as its perceived relative advantage (Rogers, 2003). However, particular innovations or changes in behavior desired by the governing officials of a social system may not always appear equally desirable to the individuals of that system (Rogers, 2003). As such, resistance to a voluntary incentive proposed by the governing body of a social system may result in a *mandate* for adoption of the innovation in question (Rogers, 2003).

The system-wide adoption of the AET among all SBAE programs in Oklahoma was the result of a mandate instated by the Agricultural Education Division of CareerTech in 2014. According to Rogers (2003), "mandates for adoption are a mechanism through which the system exerts pressure on an individual to recognize the relative advantage of an innovation" (p. 240). As stated by Leonard-Barton (1988), when the utilization of a particular innovation is mandated, "the intended user's only freedom of choice, assuming that he or she does not want to leave the organization, is how wholeheartedly to accept the innovation" (p. 604)." However, Hartwick and Barki (1994) contended the opposite, and described mandatory utilization behavior as something that often varies by each individual user.

In addition to skewing potential adopters' perceptions of an innovation on the basis of relative advantage, mandates may also result in unintended and undesired behaviors (Rogers, 2003). In a case illustration derived from preexisting research (Dugger, 2001; Luthra, 1994; Wiseman, 2002), Rogers (2003) attributed the impending scarcity of females in China to the country's 1979 implementation of the one-child policy mandate. Specifically, by combining this mandate with the emergence of sex-determining technology and a cultural preference for male children, female children were often subjected to abortion, infanticide, or malnourishment (Luthra, 1984; Rogers, 2003).

Chapter Summary

Chapter II served to provide an extensive review of literature relevant to diffusion of the AET among SBAE programs in Oklahoma for the purpose of SAE record keeping. This chapter addressed the general philosophy of SBAE, the origin, purpose, and evolution of SAE in SBAE, record keeping practices associated with SAE, implications brought on by the integration of computers in SBAE, electronic means of record keeping, and diffusion and adoption of the AET in SBAE. In addition, this chapter presented Rogers' (2003) diffusion of innovations theory as the

theoretical framework of the study. The next chapter will present the methodology employed to answer the study's 12 research questions. Specific topics to be addressed in Chapter III will include the research design and procedures, population of interest, instrumentation, and data analysis.

CHAPTER III

METHODOLOGY

This study was descriptive, predictive, and correlational in nature, and employed a cross-sectional, survey design to examine Oklahoma SBAE teachers' perceptions regarding selected attributes of the AET, as well as selected barriers to its diffusion. The purpose of this chapter is to describe the methods and procedures utilized to address the following research questions:

1. To what degree did SBAE programs in Oklahoma from each adopter category utilize selected features of the AET in 2015?
2. What were selected characteristics of SBAE programs in Oklahoma from each adopter category?
3. What were selected personal and professional characteristics of study participants (e.g., SBAE teachers in Oklahoma) from each adopter category?
4. What were the study participants' views on selected attributes impacting diffusion of the AET?
5. What were the study participants' views on selected barriers to diffusion of the AET?

6. What relationships existed between selected characteristics of SBAE programs in Oklahoma and their derived innovativeness scores?

7. What relationships existed between selected personal and professional characteristics of study participants and the derived innovativeness scores of their SBAE programs?

8. What relationships existed between selected SBAE program characteristics and study participants' views on attributes impacting diffusion of the AET?

9. What relationships existed between selected personal and professional characteristics of study participants and their views on attributes impacting diffusion of the AET?

10. What relationships existed between selected SBAE program characteristics and study participants' views on barriers to diffusion of the AET?

11. What relationships existed between selected personal and professional characteristics of study participants and their views on barriers to diffusion of the AET?

12. Can SBAE program innovativeness regarding adoption and use of the AET be predicted by study participants' selected personal and professional characteristics and views on attributes impacting diffusion of the AET?

Specific topics to be addressed in this chapter include the research design, procedures, population of interest, instrumentation, and data analysis.

Research Design

This census study employed a cross-sectional, survey design (Creswell, 2014; Gay, Mills, & Airasian, 2009). "A survey design provides a quantitative or numeric description of trends, attitudes, or opinions" (Creswell, 2014 p. 155). As data were only collected from the study participants at one point in time (Gay et al., 2009), a cross-sectional, survey design was employed

to describe the personal and professional characteristics of SBAE teachers in Oklahoma, as well as their perceptions regarding selected attributes and barriers impacting diffusion of the AET. According to Gay et al. (2009), "cross-sectional designs are effective for providing a snapshot of the current behaviors, attitudes, and beliefs in a population" (p. 176).

The research design of this study was supplemented with descriptive, correlational, and archival approaches (Johnson & Christensen, 2014; Privitera, 2017). According to Johnson and Christensen (2014), a descriptive research approach may be used to "provide an accurate description or picture of the status or characteristics of a situation or phenomenon" (p. 407). As such, this approach was employed to describe the perceptions and personal and professional characteristics of the study's participants. Moreover, utilizing a correlational research approach allowed the researcher to examine selected relationships of interest (Johnson & Christensen, 2014). Moreover, an archival approach enabled the researcher to refer to existing data to categorize each SBAE program in Oklahoma in regard to Rogers' (2003) proposed adopter categories (Privitera, 2017).

Procedures

This study was conducted by way of three distinct procedures. Prior to beginning the study, the researcher first sought approval from the Oklahoma State University Institutional Review Board (IRB). Once the proposed research was approved, the researcher categorized each SBAE program in Oklahoma by innovativeness according to Rogers' (2003) proposed adopter categories. Thereafter, data were collected by electronic delivery of a survey instrument. Each of these procedures will be discussed individually in the subsequent sections.

Institutional Review Board Approval

Before any research involving human subjects can begin, a combination of federal regulations and policies put in place by the Oklahoma State University IRB dictate that the

proposed research study must first be reviewed and approved. This review is conducted by the Oklahoma State University Office of University Research Services and IRB in an effort to ensure and protect the welfare of human subjects participating in biomedical and behavioral research. This study, identified by IRB as AG-16-33, received IRB approval on October 11, 2016 (see Appendix A). Modifications made to the original IRB application regarding recruitment correspondence and the number of participants were approved on February 17, 2017 (see Appendix B).

Adopter Categorization

In accordance with Rogers' (2003) proposed adopter categories, it was decided that each SBAE program in Oklahoma would be categorized by innovativeness regarding adoption and use of the AET. As defined by Rogers (2003), innovativeness is "the degree to which an individual (or other unit of adoption) is relatively earlier in adopting new ideas than other members of a system" (p. 267). However, because of the state-wide mandate, the AET was essentially adopted by all SBAE programs in Oklahoma at the same time. As such, for the purpose of this study, *innovativeness* was operationalized by the degree of each SBAE program's utilization of the AET during 2015. To accomplish this, the researcher employed an archival research approach (Privitera, 2017). As defined by Privitera (2017), "archival research is a type of existing data design in which events or behaviors are described based on a review and analysis of relevant historical or archival records" (p. 225). This research approach enabled the researcher to analyze archival data provided by the AET for the purpose of categorizing the adopters. This de-identified dataset included scale data for 215 unique variables indicative of each Oklahoma SBAE program's use of the AET from January to December of 2015.

To determine the selected metrics to be used for the categorization of the SBAE programs, the researcher consulted a panel of experts. This panel was comprised of faculty from

the Department of Agricultural Education, Communications, and Leadership at Oklahoma State University, and Dr. Roger Hanagriff, developer of the AET and faculty member from the Department of Agricultural Leadership, Education, and Communications at Texas A&M University. It was determined that the following items were most indicative of SBAE program innovativeness: percentage of students in grades nine through twelve with active accounts; percentage of students with profiles on the AET; total number of logins per student; total number of logins per teacher; total number of student logins per teacher; percentage of unique student logins; number of journal hours per student; number of journal entries per student; number of journal entries per student login; percentage of students with journal entries; number of course-related journal entries per student with journal entries; number of SAE-related journal entries per student with journal entries; number of FFA-related journal entries per student with journal entries; number of non-FFA-related journal entries per student with journal entries; number of FFA office-related journal entries per student with journal entries; number of CDE-related journal entries per student with journal entries; number of committee-related journal entries per student with journal entries; number of school and community-related journal entries per student with journal entries; and percentage of students with SAE records. As such, these items were selected as the 19 metrics to be used for categorization.

According to Gay et al. (2009), "the major advantage of *z* scores is that they allow scores from different tests or subtests to be compared across individuals" (p. 315). As such, the researcher and panel of experts decided to standardize the values associated with each of the 19 metrics by way of *z* score calculation (see Table 1).

Table 1

Oklahoma SBAE Programs' Utilization of Selected Features of the AET in 2015 by Adopter Category: Standardized Values (N = 357)

	Innovators (n = 9)		Early Adopters (n = 48)		Early Majority (n = 122)		Late Majority (n = 122)		Laggards (n = 56)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Students with active accounts (%)	–0.12	0.96	0.52	0.85	0.28	0.78	0.03	0.79	–1.03	1.19
Students with profiles on the AET (%)	0.87	0.92	0.55	1.09	0.21	1.04	–0.31	0.81	–0.38	0.80
Student logins per student	2.25	2.84	1.28	1.08	0.13	0.60	–0.42	0.30	–0.78	0.12
Student logins per teacher	2.47	3.20	0.98	1.01	0.13	0.76	–0.39	0.28	–0.65	0.26
Teacher logins per teacher	1.50	2.22	0.91	1.56	0.23	0.73	–0.36	0.43	–0.71	0.35
Unique student logins (%)	0.41	1.52	0.77	0.80	0.37	0.85	–0.14	0.81	–1.18	0.51
Journal hours per student	2.43	3.62	1.02	0.98	0.10	0.67	–0.39	0.28	–0.60	0.06
Journal entries per student	2.96	3.21	1.32	1.02	–0.02	0.39	–0.42	0.18	–0.61	0.02
Journal entries per student login	1.02	2.58	0.42	2.04	–0.04	0.51	–0.06	0.68	–0.27	0.05
Students with journal entries (%)	1.08	1.54	1.19	0.86	0.29	0.90	–0.38	0.62	–0.96	0.16
Course-related journal entries*	3.49	4.13	0.43	1.16	–0.13	0.38	–0.20	0.24	–0.20	0.37
SAE-related journal entries*	2.46	5.74	0.16	0.56	–0.04	0.38	–0.10	0.18	–0.21	0.04
FFA-related journal entries*	0.36	1.18	0.56	1.18	0.29	1.13	–0.21	0.71	–0.70	0.34
Non-FFA-related journal entries*	1.25	3.11	0.54	1.69	0.04	0.88	–0.22	0.35	–0.27	0.00
FFA office-related journal entries*	2.50	5.39	0.10	0.56	0.00	0.51	–0.14	0.30	–0.22	0.17
CDE-related journal entries*	0.61	2.56	0.42	1.08	0.33	1.04	–0.20	0.69	–0.71	0.22
Committee-related journal entries*	0.82	3.00	0.32	1.79	0.08	0.98	–0.17	0.15	–0.20	0.00
School/community-related journal entries*	0.59	1.55	0.60	1.34	0.31	1.12	–0.29	0.54	–0.62	0.22
Students with SAE records (%)	0.22	1.05	0.87	0.98	0.26	1.00	–0.22	0.83	–0.82	0.40

Note. *Indicates the number of journal entries per student with journal entries.

After each SBAE program received a *z* score for each metric, a composite mean of the *z* scores was reported as the program's scaled innovativeness score. All programs were then ranked in descending order and placed into the proposed adopter categories according to Rogers' (2003) specified percentages (see Table 2).

Table 2

Total SBAE Programs in Oklahoma in Each of Rogers' (2003) Adopter Categories

Adopter Category	%	*n*	$\bar{x}$ innovativeness
Innovators	2.50	9	26.85
Early Adopters	13.50	48	12.18
Early Majority	34.00	122	2.55
Late Majority	34.00	122	–4.08
Laggards	16.00	56	–10.09

Data Collection

As stated by Dillman, Smyth, and Christian (2014), electronic data collection is both cost and time effective. As such, the survey instrument utilized in this census study was developed using Qualtrics© Survey Software and distributed by electronic mail. Rather than requiring participants to submit written documentation of their informed consent, a participant information form outlining their rights as study participants preceded the the first page of the survey instrument (see Appendix C). After reading this form, participants were instructed to indicate their informed consent by proceeding to the first page of the survey instrument.

Each SBAE program in the population was assigned a distinct identification number (Dillman et al., 2014). To keep the participants' responses organized by adopter category, a total of five versions of the survey instrument were developed, with each being uniquely distributed to the potential respondents belonging to a specific adopter category. Prior to initiating the data collection period, the researcher tested the survey instrument on multiple Internet browsers and

electronic devices to ensure it would perform properly on multiple mediums (Dillman et al., 2014). On February 24, 2017, the study invitation (see Appendix D) and link to the survey instrument were electronically delivered to every SBAE teacher in the study's population.

Dillman et al. (2014) stressed the importance of carefully timing and making a sufficient number of contacts. The researcher, therefore, opted to follow the study's invitation with two participation reminders. The first reminder to participate in the study was sent to the entire population by electronic mail on March 1, 2017 (see Appendix E), and the second and final reminder to participate in the study was delivered by electronic mail on March 6, 2017 (see Appendix F). As for the timing of these contacts, according to Dillman et al. (2014), "an e-mail request received first thing in the morning can be handled before one gets into the major demands of the day, whereas an e-mail received midday is in direct competition with the ongoing demands of the day" (p. 337). Therefore, all contacts were strategically scheduled to be delivered in the early part of the day. In addition, the researcher was careful to vary the content of each point of contact to appeal to potential respondents while also decreasing the likelihood of the messages being filtered as spam (Dillman et al., 2014). Lastly, to better engage potential respondents, all three points of contact were scripted to be clear and concise (Dillman et al., 2014). Data collection ceased on March 10, 2017.

Population

The population of this study included all 357 SBAE programs in Oklahoma. Of these programs, 292 were single-teacher departments, 55 were two-teacher departments, nine were three-teacher departments, and one was a four-teacher department (Oklahoma Department of Career and Technology Education, 2016). Each SBAE program was located in one of five FFA districts: (a) the Northwest District, (b) the Southwest District, (c) the Central District, (d) the Northeast District, and (e) the Southeast District. Each FFA district was comprised of five

professional improvement (PI) groups (see Figure 5).

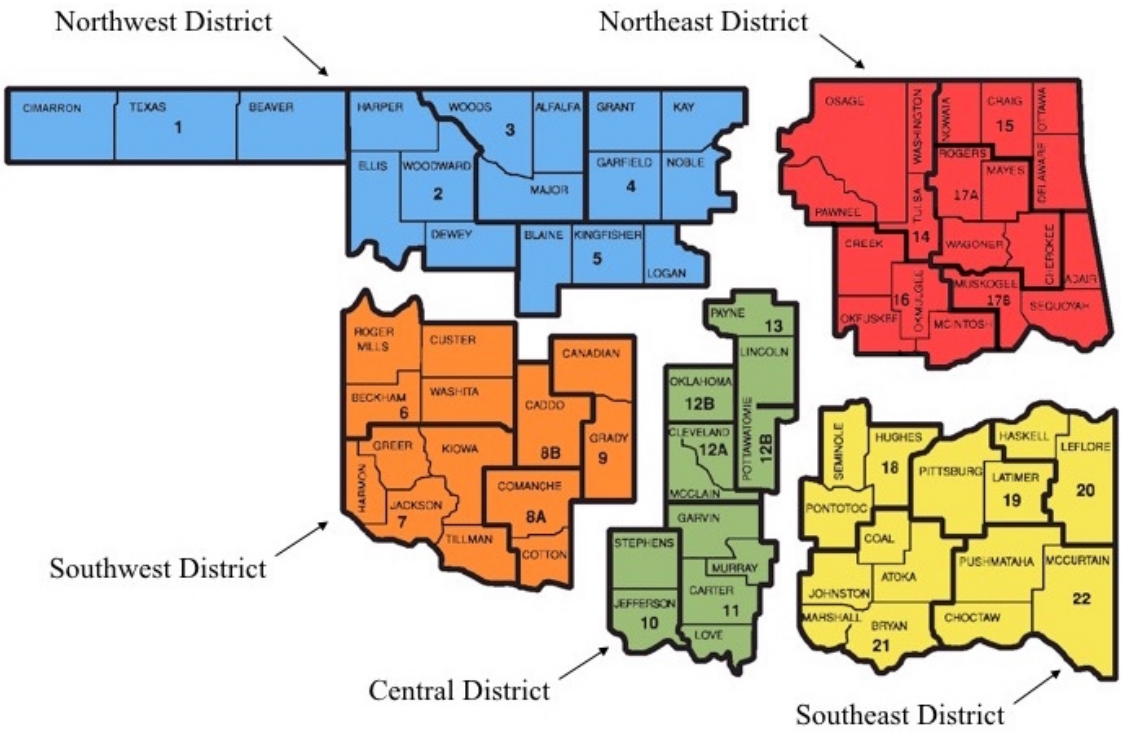

Figure 5. Oklahoma FFA districts and professional improvement groups. Adapted from *Agricultural Education Teacher and Staff Directory*, by Oklahoma Department of Career and Technology Education, 2016, Stillwater, OK: Oklahoma Department of Career and Technology Education.

For the purpose of data collection, SBAE teachers operated as proxies for their respective programs. Given the relatively small size of the population ($N = 357$), the researcher opted to conduct the study as a census (Gay et al., 2009). Prior to distribution of the survey instrument, the researcher used archival data indicative of SBAE programs' utilization of the AET to categorize each program according to Rogers' (2003) proposed adopter categories and associated percentages. In this regard, nine (2.5%) of the SBAE programs in Oklahoma were categorized as the innovators, 48 (13.5%) as the early adopters, 122 (34%) as the early majority, 122 (34%) as the late majority, and 56 (16%) as the laggards (Rogers, 2003; see Table 2). No more than one

teacher from each SBAE program was advised to complete the survey instrument on their program's behalf. In the case of the state's 65 multi-teacher departments, only the SBAE teacher most responsible for the oversight of student record keeping practices and use of the AET was instructed to complete the survey instrument. However, multiple responses were received on behalf of nine SBAE programs. As such, mean responses were reported for each SBAE program with two or more SBAE teacher respondents.

In total, 166 teachers from 156 SBAE programs completed the survey instrument, yielding a 43.70% program response rate. Of the study's 156 responding programs, four were innovators, 30 were early adopters, 51 belonged to the early majority, 50 belonged to the late majority, and 21 were laggards (see Table 3).

Table 3

Population Response to the Survey Instrument by Adopter Category

Innovators	*f*	%
Respondents	4	44.44
Nonrespondents	5	55.55
Total	9	100.00
Early Adopters		
Respondents	30	62.50
Nonrespondents	18	37.50
Total	48	100.00
Early Majority		
Respondents	51	41.80
Nonrespondents	71	58.20
Total	122	100.00
Late Majority		
Respondents	50	40.98
Nonrespondents	72	59.02
Total	122	100.00
Laggards		
Respondents	21	37.50
Nonrespondents	35	62.50
Total	56	100.00

Instrumentation

This study employed a researcher-modified version of Li's (2004) survey instrument. In total, the final, researcher-modified, survey instrument was comprised of three distinct parts and 59 items, which included 21 statements regarding Rogers' (2003) perceived attributes of the AET, 20 statements about selected barriers to its adoption, and 18 questions describing the participants' personal and professional characteristics (see Appendix G).

Li's (2004) Survey Instrument

The initial survey instrument designed by Li (2004) was employed to investigate the perceptions of China Agricultural University (CAU) faculty members regarding selected attributes and barriers affecting diffusion and adoption of web-based distance education (WBDE). Li (2004) referenced preexisting works of literature published by Moore and Benbasat (1991), Muilenburg and Berge (2001), and Rogers (2003) to develop this survey instrument. Part I of the original instrument "was designed to measure participants' stage of the innovation-decision process related to WBDE" and relied on Rogers' (2003) model of the innovation-decision process as its theoretical foundation (Li, 2004, p. 42). In addition to the five stages proposed by Rogers' (2003) model, Li (2004) opted to include "no knowledge" as the initial stage of the innovation-decision process. The first of the two items included in Part I of the instrument asked the participants to indicate whether they agreed, disagreed, or were unsure in regard to the following statement: "Limited access to higher education by students is a big problem for Chinese institutions of higher education" (Li, 2004, p. 42). The second item comprising Part I of the instrument provided six statements, with each representing a specific stage of the innovation-decision process. For this item, study participants were instructed to select the statement most representative of their present position in the innovation-decision process (Li, 2004).

Part II of Li's (2004) instrument was intended to measure participants' views of WBDE vis-à-vis Rogers' (2003) five attributes of innovations. This portion of the instrument was modified from a preexisting instrument developed by Moore and Benbasat (1991). Participants were instructed to signify their perceptions of WBDE per Rogers' (2003) five attributes of innovations by affording responses to a chain of 20 statements. Responses were collected using a five-point, Likert-type scale, which included the following points: "1=Strongly Disagree (SD); 2=Disagree (D); 3=Neutral (N); 4=Agree (A); and 5=Strongly Agree (SA)" (Li, 2004, p. 43).

Li (2004) developed Part III of the survey instrument to gauge participants' perceptions on barriers impacting diffusion of WBDE. The ten barriers selected for this portion of the instrument were derived from Muilenburg and Berge's (2001) study regarding barriers to diffusion of distance education (Li, 2004). "These barriers included: concerns about time, concerns about incentives, WBDE program credibility, financial concerns, planning issues, fear of technology, conflict with traditional education, technical expertise, administrative support, and infrastructure" (Li, 2004, p. 43). Participants were instructed to signify their perceptions regarding the selected barriers to diffusion of WBDE by providing a response to each of the 40 statements (Li, 2004). Similar to Part II, responses were collected by way of a five-point, Likert-type scale, and included the subsequent anchors: "1=No Barrier (NB); 2=Weak Barrier (WB); 3=Moderate Barrier (MB); 4=Strong Barrier (SB); and 5=Very Strong Barrier (VSB)" (Li, 2004, p. 43).

Finally, Part IV was developed to collect data on selected personal and professional characteristics of the study participants, and relied on Rogers' (2003) proposed adopter categories as the theoretical foundation (Li, 2004). The items that comprised this portion of the instrument focused on the participants' college, gender, age, highest degree earned, academic rank, years of post-secondary teaching experience, and type and duration of experience providing instruction via

distance education (Li, 2004). Prior to completion of the instrument, participants were allowed the opportunity to provide additional comments by way of text entry (Li, 2004).

Researcher-Modified Survey Instrument

Because adoption of the AET was mandated among every SBAE program in Oklahoma, Rogers' (2003) theory suggests that all members of the population are presently in the implementation stage of the innovation-decision process. As such, a researcher decision was made to omit Part I of the original instrument designed by Li (2004). The researcher, however, opted to preserve Part II of Li's (2004) survey instrument, which measured participants' perceptions of WBDE by way of Rogers' (2003) perceived attributes. Due to the fact that these statements were originally designed to depict WBDE as the innovation in question, a need existed to modify the items to better conform to the AET. Although some statements were modified only slightly (i.e., word choice and tense), others were adapted more robustly to fit the purpose and context of this study. After being modified, this portion of the original instrument became Part I of the survey instrument used in this study (see Appendix G). Part I of the final survey instrument was comprised of 21 statements designed to measure participants' perceptions of the AET based on Rogers' (2003) five perceived attributes of innovations, with each attribute acting as an individual construct for this portion of the instrument (see Appendix G). Similar to the original instrument designed by Li (2004), study participants were instructed to denote their perceptions of the AET per Rogers' (2003) five attributes of innovations using a five-point, Likert-type scale. The five-point, Likert-type scale included these anchors: 1 = *Strongly disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, and 5 = *Strongly agree*.

In an effort to better address the research questions guiding this study, six of the ten original barrier constructs included in Part III of Li's (2004) survey instrument were retained and subjected to the same degree of modification as described above. According to Li (2004), these

selected barrier constructs were originally derived from findings presented in the literature. However, because little research regarding the AET presently exists, the researcher consulted a panel of individuals having recently left the SBAE profession in Oklahoma to select and modify the statements pertaining to the participants' perceptions of potential barriers to diffusion of the AET. Part II of the final survey instrument consisted of 20 statements divided among the following barrier constructs: "concerns about time," "credibility of the AET," "lack of support," "fear of technology," "technical expertise," and "lack of resources" (see Appendix G). Fifteen of the 20 items were modified from the original instrument, and five were developed with the assistance of the panel. Participants were instructed to indicate a response for each statement by selecting one of five, Likert-type scale points: 1 = *No barrier*, 2 = *Weak barrier*, 3 = *Moderate barrier*, 4 = *Strong barrier*, and 5 = *Very strong barrier*.

Last, Part III of the final survey instrument (see Appendix G) was comprised of 18 items. Of these items, 17 were provided in reference to respondents' personal and professional characteristics: (a) sex, (b) age, (c) race/ethnicity, (d) teacher certification path, (e) highest degree earned, (f) years of experience teaching SBAE, (g) years teaching at current school, (h) number of teachers in current SBAE program, (i) current Oklahoma FFA District, (j) population of current city or town of residence, (k) population of current city or town of employment, (l) number of students enrolled in current SBAE program, (m) number of FFA members in current FFA chapter, (n) rank of SAE program type by participation in current SBAE program, (o) percentage of student participation by SAE program type in current SBAE program, (p) perceived importance of SAE record keeping in the student acquisition of FFA degrees and awards, and (q) perceived computer skill level. Prior to completing and exiting the survey instrument, participants were given the opportunity to provide a qualitative, text entry response to this item: "Please provide any additional comments you may have regarding the AET and your adoption of this technology" (see Appendix G).

Validity

Gay et al. (2009) defined validity as "the degree to which a test measures what it is supposed to measure and, consequently, permits appropriate interpretation of scores" (p. 154). According to Creswell (2014), "when one modifies an instrument or combines instruments in a study, the original validity and reliability may not hold for the new instrument, and it becomes important to reestablish validity and reliability during data analysis" (p. 160). One means by which a researcher may reestablish the validity of their instrument is through a panel of experts (Gay et al., 2009). As such, the researcher-modified, survey instrument was examined for face and content validity by a panel of experts from the Department of Agricultural Education, Communications, and Leadership at Oklahoma State University.

Reliability

"Reliability is the degree to which a test consistently measures whatever it is measuring" (Gay et al., 2009, p. 158). When an instrument is reliable, an individual completing the instrument on more than one occasion should receive a similar score each time (Gay et al., 2009; Johnson & Christensen, 2014). According to Field (2013), "to be valid the instrument must first be reliable" (p. 13). Regarded by Field (2013) as the most prevalent measure of reliability, Cronbach's alpha estimates are used to indicate how consistently an instrument is performing. Cronbach's alpha estimates within the range of .70 and .80 are indicative of a satisfactory degree of reliability (Field, 2013). By way of post-hoc reliability analysis, Li (2004) reported Cronbach's alpha estimates ranging from .70 to .94 for each construct of the original survey instrument.

According to Dillman et al. (2014), in addition to allowing the researcher the opportunity to assess the entire instrumentation process prior to its official launch, a pilot study can also provide an understanding of how the intended population or sample will experience the instrument. As such, a pilot test of the modified survey instrument was conducted using SBAE

teachers in Texas. This population was selected for the pilot study due to its similarities to the primary study's population of interest. The researcher utilized purposive sampling procedures and elected to conclude the pilot study after valid responses were received from 30 Texas SBAE teachers (Johnson & Christensen, 2014). Data collection commenced on November 18, 2016 and ceased on November 27, 2016 with a total of 31 valid responses. Reliability of the instrument was estimated by calculating Cronbach's alpha estimates (see Table 4).

Table 4

Reliability of Dependent Variables in the Pilot Test

Items	α
Attributes of the AET	
1. Relative Advantage	.70
2. Compatibility	.79
3. Complexity	.94
4. Trialability	.86
5. Observability	.83
Barriers to diffusion of the AET	
1. Concerns about time	.85
2. Credibility of the AET	.74
3. Lack of support	.78
4. Fear of technology	.73
5. Technical expertise	.82
6. Lack of resources	.89

Following the pilot test of the instrument, the researcher consulted a panel of experts from the Department of Agricultural Education, Communications, and Leadership at Oklahoma State University. Each expert provided their own feedback and recommendations for improvement, which primarily included the simplification of selected word choices to enhance item clarity and readability. In an effort to address the relatively low Cronbach's alpha estimate of the "relative advantage" construct, each statement was slightly modified to more clearly align

with Rogers' (2003) posits regarding relative advantage. In addition, a double-barreled statement within the "credibility of the AET" construct was split into two items to reduce any potential ambiguity among the participants' responses (Dillman et al., 2014). After the researcher made the recommended changes, the final survey instrument and its 59 items were approved by the panel of experts. As with the pilot test, reliability of the final instrument was estimated by computing Cronbach's alpha estimates (see Table 5).

Table 5

Reliability of Dependent Variables in the Final Instrument

Items	α
Attributes of the AET	
1. Relative Advantage	.85
2. Compatibility	.87
3. Complexity	.91
4. Trialability	.88
5. Observability	.70
Barriers to diffusion of the AET	
1. Concerns about time	.85
2. Credibility of the AET	.88
3. Lack of support	.84
4. Fear of technology	.79
5. Technical expertise	.78
6. Lack of resources	.90

Data Analysis

In an effort to reduce the likelihood of subjecting the results of this study to human error, the data were analyzed via Version 21 of IBM Statistical Package for Social Sciences (SPSS©) for Apple© computers. In addition to analyzing the participants' responses to the survey instrument, the researcher also utilized SPSS© to derive the SBAE program innovativeness scores and make comparisons among early and late respondents.

Selected Methods of Analysis by Research Question

The data related to research questions one, two, three, four, and five were analyzed descriptively. Specifically, to address research question one, standardized *z* scores were calculated for the archival data indicative of each Oklahoma SBAE programs' innovativeness and utilization of selected features of the AET. To answer research questions two and three, means, standard deviations, frequencies, and percentages were calculated to describe the personal and professional characteristics of the SBAE teachers in Oklahoma belonging to each adopter category. To address research questions four and five, means and standard deviations were calculated to describe the participants' perceptions of the AET regarding Rogers' (2003) attributes of innovations and selected barriers to diffusion of the AET.

The selected relationships addressed in research questions six through eleven were measured by correlational analysis. In that regard, Pearson correlation coefficients (r) were calculated to examine relationships of interest between SBAE program innovativeness scores, selected SBAE program characteristics, and selected personal and professional characteristics. Spearman correlation coefficients (r_s) were used to measure the relationships between selected SBAE program characteristics, selected personal and professional characteristics, perceptions of the AET based on Rogers' (2003) attributes of innovations, and perceptions of selected barriers to diffusion of the AET. The magnitude of each relationship was reported according to Davis' (1971) conventions for interpreting effect size from the correlation coefficient. As suggested by Field (2013), the researcher assessed the data for normality and linearity prior to conducting the analyses. After examining scatterplots, histograms, and P-P plots, these assumptions were deemed tenable (Field, 2013).

For research question twelve, the researcher employed a hierarchical, block regression to determine whether SBAE program innovativeness regarding adoption and use of the AET could

be predicted by an individual's selected personal and professional characteristics and perceptions of the AET based on Rogers' (2003) attributes of innovations. The first hierarchical regression block (Model 1) included three predictors derived from Rogers' (2003) generalizations about earlier and later adopters: highest degree earned, SBAE program enrollment, and cosmopoliteness. To align SBAE teachers' highest degree earned with Rogers' (2003) generalization about earlier adopters having more years of formal education than later adopters, ordinal codes of 1 through 4 were assigned to the responses of Bachelor's, Master's, Education Specialist, and Doctorate (see Appendix G). The number of students enrolled in each SBAE program was included in the first regression block to represent Rogers' (2003) contention about earlier adopters having larger-sized units than later adopters. Finally, created as a new variable, cosmopoliteness was operationalized as the absolute value of the difference between each participant's home and school city or town population. The second regression block (Model 2) included participants' perceptions of the AET based on Rogers' (2003) five attributes of innovations: relative advantage, compatibility, complexity, trialability, and observability. Age, the final predictor of interest, was introduced in the third regression block (Model 3).

After running the initial regression analysis, the researcher assessed the residuals for the basic assumptions of linearity, homoscedasticity, multicollinearity, independence, and normality (Field, 2013). The assumptions of linearity and homoscedasticity were found to be tenable on review of the standardized residuals versus standardized predicted values scatterplot, as the distribution was random, yet even (Field, 2013). The assumption of multicollinearity was also met, because the tolerance statistics were found to be greater than 0.2, and the variance inflation factor statistics were less than 10 (Field, 2013). In addition, as the value of the Durbin-Watson statistic was 2.13, the assumption of independence was met (Field, 2013). Finally, the assumption of normality was assessed and found to be tenable on the examination of the standardized residual, scaled innovativeness score histogram (Field, 2013). To convey the findings, the

researcher reported the standardized beta coefficient (β) and significance value (p) for each predictor variable. The coefficient of determination (R^2) and change in R^2 (ΔR^2) were also reported for all three models.

Comparison of Early and Late Respondents

According to Lindner, Murphy, and Briers (2001), "nonresponse error can be a threat to the external validity of a study when [census, simple random, stratified, purposive, cluster, delphi, convenience, or systematic] sampling procedures are used and less than 100% response rate is achieved" (p. 51). As such, the researcher elected to perform comparisons among the study's early and late respondents in order to address the potential threat of nonresponse error (Lindner et al., 2001). Specifically, early and late respondents were compared regarding their perceptions of the AET based on Rogers' (2003) five attributes of innovations, as well as their perceptions of selected barriers to diffusion of the AET.

When making comparisons between early and late respondents, "late respondents [should be] defined operationally as those who respond in the last wave of respondents in successive follow-ups to a questionnaire, that is, in response to the last stimulus" (Lindner et al., 2001, p. 52). However, "if the last stimulus does not generate 30 or more responses, the researcher should 'back up' and use responses to the last two stimuli as his or her late respondents" (Lindner et al., 2001, p. 52). Therefore, as the final stimulus only elicited 27 responses, those responding prior to the second stimulus sent on March 1, 2017 were operationalized as the early respondents (n = 94), and those responding thereafter were operationalized as the late respondents (n = 72).

No statistically significant differences were observed among the early and late respondents regarding their perceptions of the AET on the basis of Rogers' (2003) five attributes of innovations: relative advantage, $t(164) = -1.13$, $p = .26$; compatibility, $t(164) = -0.61$, $p = .54$;

complexity, $t(164) = -1.51$, $p = .13$; trialability, $t(164) = -1.06$, $p = .29$; and observability, $t(164) = -0.68$, $p = .50$ (see Table 6).

Table 6

Comparison of Early and Late Respondents' Views of the AET per Rogers' (2003) Attributes

Response Status	*n*	*M*	SD	*t*	*p**
Relative Advantage					
Early Respondents	94	3.37	1.05	–1.13	.26
Late Respondents	72	3.55	0.98		
Compatibility					
Early Respondents	94	3.19	0.92	–0.61	.54
Late Respondents	72	3.28	1.00		
Complexity					
Early Respondents	94	2.05	0.93	–1.51	.13
Late Respondents	72	2.27	0.99		
Trialability					
Early Respondents	94	3.28	0.94	–1.06	.29
Late Respondents	72	3.43	0.92		
Observability					
Early Respondents	94	3.46	0.71	–0.68	.50
Late Respondents	72	3.54	0.78		

Note. *Statistically significant difference if $p < .05$.

Similarly, no statistically significant differences were observed among the early and late respondents regarding their perceptions of selected barriers to diffusion of the AET: concerns about time, $t(155) = 1.37$, $p = .17$; credibility of the AET, $t(155) = 0.86$, $p = .39$; lack of support, $t(155) = 1.43$, $p = .16$; fear of technology, $t(155) = -0.41$, $p = .68$; technical expertise, $t(155) = 1.28$, $p = .20$; and lack of resources, $t(155) = 0.98$, $p = .33$ (see Table 7). As such, it was determined that nonresponse error would not impose a limitation on the study, and analyses proceeded (Lindner et al., 2001).

Table 7

Comparison of Early and Late Respondents' Views of Selected Barriers to Diffusion of the AET

Response Status	*n*	*M*	SD	*t*	*p**
Concerns about time					
Early Respondents	91	3.60	0.94	1.37	.17
Late Respondents	66	3.39	0.88		
Credibility of the AET					
Early Respondents	91	3.02	1.10	0.86	.39
Late Respondents	66	2.87	1.07		
Lack of support					
Early Respondents	91	3.00	0.99	1.43	.16
Late Respondents	66	2.77	0.98		
Fear of technology					
Early Respondents	91	2.54	1.11	–0.41	.68
Late Respondents	66	2.61	1.07		
Technical expertise					
Early Respondents	91	2.96	0.95	1.28	.20
Late Respondents	66	2.76	0.94		
Lack of resources					
Early Respondents	91	3.11	1.34	0.98	.33
Late Respondents	66	2.91	1.14		

Note. *Statistically significant difference if $p < .05$.

Chapter Summary

The two-fold purpose of this study was to 1) describe the relationships between the innovativeness of SBAE programs in Oklahoma and the perceptions of SBAE teachers regarding diffusion of the AET; 2) predict the innovativeness of SBAE programs in Oklahoma from SBAE teachers' selected personal and professional characteristics and perceptions regarding diffusion of the AET. To answer the research questions guiding this study, Chapter III described the study's research design, population, procedures, instrumentation, data collection, and data analysis. Chapter IV will present the findings associated with each of the study's 12 research questions.

CHAPTER IV

FINDINGS

Despite its relatively recent emergence, The Agricultural Experience Tracker (the AET) has already been adopted by many individuals and entities in the school-based agricultural education (SBAE) profession (The Agricultural Experience Tracker, 2017a; National FFA Organization, 2013). However, the degree and extent to which this innovation is being adopted has yet to be confirmed, and a complete lack of targeted research exists pertaining to its diffusion and adoption. As such, this study served to address this paucity in the literature by examining this phenomenon through the lens of Rogers' (2003) diffusion of innovations theory.

Chapter I presented an introduction and concise overview of the study, which included the background, problem, purpose, research questions, definitions of key terms, limitations, and assumptions. Chapter II offered an expansive review of pertinent literature, as well as the theoretical framework of the study, Rogers' (2003) diffusion of innovations theory. Chapter III described the research design, population, procedures, instrumentation, data collection, and data analysis of the study. Chapter IV will present the findings derived from the study's data to answer 12 research questions:

1. To what degree did SBAE programs in Oklahoma from each adopter category utilize selected features of the AET in 2015?

2. What were selected characteristics of SBAE programs in Oklahoma from each adopter category?

3. What were selected personal and professional characteristics of study participants (e.g., SBAE teachers in Oklahoma) from each adopter category?

4. What were the study participants' views on selected attributes impacting diffusion of the AET?

5. What were the study participants' views on selected barriers to diffusion of the AET?

6. What relationships existed between selected characteristics of SBAE programs in Oklahoma and their derived innovativeness scores?

7. What relationships existed between selected personal and professional characteristics of study participants and the derived innovativeness scores of their SBAE programs?

8. What relationships existed between selected SBAE program characteristics and study participants' views on attributes impacting diffusion of the AET?

9. What relationships existed between selected personal and professional characteristics of study participants and their views on attributes impacting diffusion of the AET?

10. What relationships existed between selected SBAE program characteristics and study participants' views on barriers to diffusion of the AET?

11. What relationships existed between selected personal and professional characteristics of study participants and their views on barriers to diffusion of the AET?

12. Can SBAE program innovativeness regarding adoption and use of the AET be predicted by study participants' selected personal and professional characteristics and views on attributes impacting diffusion of the AET?

The findings of this study will be presented by research question in the subsequent sections. The descriptive data pertaining to research questions one through five will be reported in the form of means, standard deviations, frequencies, and percentages. The data associated with questions six through eleven will be reported in the form of Pearson correlation coefficients (r) and Spearman correlation coefficients (r_s). Standardized beta coefficients (β), significance values (p), the coefficient of determination (R^2), and the change in R^2 (ΔR^2) will be used to report the data pertaining to research question twelve.

Findings Pertaining to Research Question One

Research question one was intended to determine the degree to which SBAE programs in Oklahoma utilized selected features of the AET in 2015. Prior to classifying each program according to Rogers' (2003) proposed adopter categories, 19 metrics indicative of utilization of the AET were selected by the researcher and a panel of experts comprised of faculty at Oklahoma State University and Texas A&M University. By way of an archival research approach (Privitera, 2017), data were gathered from an existing dataset provided by the AET. To determine each SBAE program's scaled, innovativeness score, all collected data values were standardized by calculating z scores (Gay et al., 2009). Means and standard deviations for the original and standardized values of each metric were reported according to each adopter category. The original values indicative of each SBAE program's utilization of selected features of the AET in 2015 are organized by adopter category in Table 8.

Table 8

Oklahoma SBAE Programs' Utilization of Selected Features of the AET in 2015 by Adopter Category: Original Values (N = 357)

	Innovators (*n* = 9)		Early Adopters (*n* = 48)		Early Majority (*n* = 122)		Late Majority (*n* = 122)		Laggards (*n* = 56)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Students with active accounts (%)	68.47	23.72	84.20	20.88	78.36	19.04	72.02	19.53	45.95	29.40
Students with profiles on the AET (%)	79.51	45.48	63.80	53.90	47.15	51.38	21.69	39.92	18.02	39.56
Student logins per student	12.59	11.49	8.67	4.38	4.04	2.43	1.78	1.22	0.33	0.49
Student logins per teacher	858.61	848.75	465.33	267.64	239.33	201.47	100.49	73.13	32.58	69.80
Teacher logins per teacher	123.44	107.80	95.02	75.47	62.16	35.52	33.20	20.82	16.59	16.80
Unique student logins (%)	94.00	74.21	111.46	38.66	92.04	40.86	67.37	39.28	17.25	24.49
Journal hours per student	121.66	144.52	65.60	39.27	28.77	26.74	9.29	11.30	0.71	2.24
Journal entries per student	16.16	14.50	8.74	4.58	2.73	1.74	0.88	0.83	0.04	0.09
Journal entries per student login	6.17	12.15	3.34	9.61	1.15	2.40	1.07	3.20	0.09	0.23
Students with journal entries (%)	81.65	59.78	85.77	33.41	50.86	34.94	24.91	23.91	2.41	6.35
Course-related journal entries*	6.79	7.39	1.32	2.07	0.32	0.67	0.20	0.44	0.19	0.65
SAE-related journal entries*	21.76	46.52	3.09	4.53	1.45	3.06	1.00	1.48	0.11	0.29
FFA-related journal entries*	2.80	2.79	3.27	2.80	2.63	2.66	1.46	1.67	0.29	0.79
Non-FFA-related journal entries*	0.45	0.93	0.24	0.50	0.09	0.26	0.02	0.11	0.00	0.00
FFA office-related journal entries*	1.62	3.16	0.22	0.33	0.16	0.30	0.07	0.18	0.03	0.10
CDE-related journal entries*	1.79	3.27	1.54	1.38	1.43	1.33	0.76	0.89	0.10	0.28
Committee-related journal entries*	0.08	0.22	0.04	0.13	0.02	0.07	0.00	0.01	0.00	0.00
School/community-related journal entries*	1.27	1.54	1.29	1.33	1.00	1.11	0.39	0.54	0.07	0.22
Students with SAE records (%)	30.80	26.27	47.11	25.00	31.88	25.05	19.80	20.97	4.69	9.95

Note. *Indicates the number of journal entries per student with journal entries.

Of the five adopter categories, the innovators (n = 9) were found to have the largest mean percentage of students with profiles on the AET (M = 79.51; SD = 45.48), as well as the most student logins per student (M = 12.59; SD = 11.49), student logins per teacher (M = 858.61; SD = 848.47), teacher logins per teacher (M = 123.44; SD = 107.80), journal hours per student (M = 121.66; SD = 144.52), journal entries per student (M = 16.16; SD = 14.50), and journal entries per student login (M = 6.17; SD = 12.15; see Table 8). In addition, the innovators also had the most course-related (M = 6.69; SD = 7.39), SAE-related (M = 21.76; SD = 46.52), non-FFA-related (M = 0.45; SD = 0.93), FFA office-related (M = 1.62; SD = 3.16), CDE-related (M = 1.79; SD = 3.27), and committee-related (M = 0.08; SD = 0.22) journal entries per student with journal entries. However, of all five adopter categories, the innovators had the second lowest mean percentage of students with active accounts on the AET (M = 68.47; SD = 23.72), and the third lowest mean percentage of students with SAE records on the AET (M = 30.80; SD = 26.27; see Table 8).

The SBAE programs in Oklahoma categorized as the early adopters (n = 48) were found to have the largest mean percentages of students with active accounts (M = 84.20; SD = 20.88), students with journal entries (M = 85.77; SD = 33.41), and students with SAE records on the AET (M = 47.11; SD = 25.00; see Table 8). Moreover, the early adopters had the largest mean percentage of unique student logins (M = 111.46; SD = 38.66), as well as the most FFA-related (M = 3.27; SD = 2.80) and school and community-related (M = 1.29; SD = 1.33) journal entries per student with journal entries. Although the means associated with student logins per teacher (M = 465.33; SD = 267.64), journal hours per student (M = 65.60; SD = 39.27), journal entries per student (M = 8.74; SD = 4.58), and journal entries per student login (M = 3.34; SD = 9.61) were the second highest of the five categories, each of these values were only about one-half of those found for the innovators. Further, the early adopters had roughly 18 fewer SAE-related journal entries per student (M = 3.09; SD = 4.53) than the innovators (see Table 8).

Of the five adopter categories, the SBAE programs belonging to the early majority category (n = 122) were found to have the second largest mean percentage of students with active accounts on the AET (M = 78.36; SD = 19.04), as well as the second largest mean percentage of students with SAE records on the AET (M = 31.88; SD = 25.05; see Table 8). Although less than one-half of the students enrolled in SBAE programs within the early majority had profiles on the AET (M = 47.15; SD = 51.38), just over one-half of the students enrolled in SBAE programs within this category had journal entries on the AET (M = 50.86; SD = 34.94). However, means indicative of less than one journal entry per student with journal entries were found for each of the following types: course-related journal entries (M = 0.32; SD = 0.67); non-FFA-related journal entries (M = 0.09; SD = 0.26); FFA office-related journal entries (M = 0.16; SD = 0.30); and committee-related journal entries (M = 0.02; SD = 0.07). The mean number of journal entries for SBAE programs belonging to the early majority was less than three entries per student (M = 2.73; SD = 1.74), and the SBAE programs within this category recorded approximately 93 fewer journal hours per student than those programs classified as innovators (see Table 8).

As for the late majority (n = 122), approximately 72% of all students enrolled in SBAE programs in this category were found to have active accounts on the AET (M = 72.02; SD = 19.53; see Table 8). Conversely, less than 22% of all students had profiles on the AET (M = 21.69; SD = 39.92), and less than 20% were found to have SAE records on the AET (M = 19.80; SD = 20.97). Furthermore, less than one-fourth of all students belonging to SBAE programs in this category had journal entries (M = 24.91; SD = 23.91). Of the students with journal entries on the AET, the composite means indicate each student was found to have at least one SAE-related journal entry (M = 1.00; SD = 1.48) and one FFA-related journal entry (M = 1.46; SD = 1.67). However, the mean number of journal entries per student with journal entries was less than one for each of the subsequent journal types: course-related journal entries (M = 0.20; SD = 0.44); non-FFA-related journal entries (M = 0.02; SD = 0.11); FFA office-related journal entries (M =

0.07; *SD* = 0.18); CDE-related journal entries (*M* = 0.76; *SD* = 0.89); committee-related journal entries (*M* = 0.00; *SD* = 0.01); and school and community-related journal entries (*M* = 0.39; *SD* = 0.54; see Table 8).

For each of the 19 metrics, the laggards (*n* = 56) presented the lowest composite means of the five adopter categories. Less than one-half of all students enrolled in SBAE programs belonging to this adopter category had active accounts on the AET (*M* = 45.95; *SD* = 29.40; see Table 8). For this particular metric, the closest mean derived from any of the other four categories was still greater by more than 20%. Similarly, less than 3% of SBAE students in this adopter category were found to have journal entries on the AET (*M* = 2.41; *SD* = 6.35), whereas the next lowest mean for this metric surpassed this value by nearly 23%. Moreover, approximately 18% of SBAE students in this adopter category were found to have profiles on the AET (*M* = 18.02; *SD* = 39.56), and less than 5% of these SBAE students had SAE records on the AET (*M* = 4.69; *SD* = 9.95). SBAE Teachers working in programs classified as laggards logged into the AET less than 17 times each (*M* = 16.59; *SD* = 16.80), and the mean number of times each student logged in was found to be less than one (*M* = 0.33; *SD* = 0.49; see Table 8).

Students with journal entries in this category did not record any non-FFA (*M* = 0.00; *SD* = 0.00) or committee-related (*M* = 0.00; *SD* = 0.00) journal entries in 2015. Means indicating less than one journal entry per student with journal entries were found for the remaining types of entries: course-related journal entries (*M* = 0.19; *SD* = 0.65); SAE-related journal entries (*M* = 0.11; *SD* = 0.29); FFA-related journal entries (*M* = 0.29; *SD* = 0.79); FFA office-related journal entries (*M* = 0.03; *SD* = 0.10); CDE-related journal entries (*M* = 0.10; *SD* = 0.28); and school and community-related journal entries (*M* = 0.07; *SD* = 0.22; see Table 8).

Findings Pertaining to Research Question Two

Research question two sought to describe selected characteristics of SBAE programs in Oklahoma according to their derived adopter categories. For each participating SBAE program that provided valid responses (n = 136), the means and standard deviations regarding each program's number of teachers, city or town population, SBAE enrollment, and FFA membership are displayed by adopter category in Table 9. The means found for the number of teachers currently employed in each SBAE program were 1.25 (SD = 0.50) for the innovators (n = 4), 1.37 (SD = 0.57) for the early adopters (n = 27), 1.28 (SD = 0.54) for the early majority (n = 46), 1.38 (SD = 0.54) for the late majority (n = 42), and 1.12 (SD = 0.33) for the laggards (n = 17). The mean population of the city or town of each SBAE program was 4,258.75 (SD = 7,177.13) for the innovators, 20,628.78 (SD = 85,980.55) for the early adopters, 2,449.74 (SD = 3,172.59) for the early majority, 6,801.69 (SD = 12,559.95) for the late majority, and 983.47 (SD = 671.84) for the laggards. The mean number of students enrolled in each SBAE program was 91.50 (SD = 25.80) for the innovators, 89.44 (SD = 53.43) for the early adopters, 82.83 (SD = 41.81) for the early majority, 89.96 (SD = 42.01) for the late majority, and 67.76 (SD = 22.76) for the laggards. The mean number of FFA members belonging to each SBAE program was 89.50 (SD = 20.60) for the innovators, 85.19 (SD = 39.98) for the early adopters, 82.87 (SD = 41.95) for the early majority, 89.92 (SD = 41.93) for the late majority, and 67.76 (SD = 22.76) for the laggards (see Table 9).

Table 9

Selected Characteristics of Participating SBAE Programs in Oklahoma by Adopter Category

	Innovators (n = 4)		Early Adopters (n = 27)		Early Majority (n = 46)		Late Majority (n = 42)		Laggards (n = 17)		Total (n = 136)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Teachers in SBAE program	1.25	0.50	1.37	0.57	1.28	0.54	1.38	0.54	1.12	0.33	1.31	0.52
City or town population	4258.75	7177.13	20628.78	85980.55	2449.74	3172.59	6801.69	12559.95	983.47	671.84	7272.72	39053.24
SBAE program enrollment	91.50	25.80	89.44	53.43	82.83	41.81	89.96	42.01	67.76	22.76	84.72	42.39
FFA membership	89.50	20.60	85.19	39.98	82.87	41.95	89.92	41.93	67.76	22.76	83.81	39.31

The frequencies and percentages of SBAE programs belonging to each Oklahoma FFA District are presented in Table 10 by adopter category. Of the responding programs categorized as innovators (n = 4), 25% were from the Southwest District, 25% were from the Central District, and 50% were from the Northeast District. Of the early adopters (n = 27), approximately 22% of the responding programs were from the Northwest District, 22% were from the Southwest District, 11% were from the Central District, 30% were from the Northeast District, and 15% were from the Southeast District. For the responding SBAE programs in the early majority (n = 46), approximately 20% were from the Northwest District, 9% were from the Southwest District, 24% were from the Central District, 26% were from the Northeast District, and 22% were from the Southeast District. As for those responding programs categorized as the late majority (n = 42), approximately 12% were from the Northwest District, 5% were from the Southwest District, 33% were from the the Central District, 33% were from the Northeast District, and 17% were from the Southeast District. And in the case of the responding SBAE programs which comprised the laggards (n = 17), approximately 18% were from the Northwest District, 18% were from the Southwest District, 6% were from the the Central District, 18% were from the Northeast District, and 41% were from the Southeast District. Of all 136 participating SBAE programs with valid responses, approximately 17% were from the Northwest District, 12% were from the Southwest District, 22% were from the the Central District, 29% were from the Northeast District, and 21% were from the Southeast District (see Table 10).

Table 10

Participating SBAE Programs in Each Oklahoma FFA District by Adopter Category

	Innovators (*n* = 4)		Early Adopters (*n* = 27)		Early Majority (*n* = 46)		Late Majority (*n* = 42)		Laggards (*n* = 17)		Total (*n* = 136)	
	f	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*
Northwest			6.00	22.22	9.00	19.57	5.00	11.90	3.00	17.65	23.00	16.91
Southwest	1.00	25.00	6.00	22.22	4.00	8.70	2.00	4.76	3.00	17.65	16.00	11.76
Central	1.00	25.00	3.00	11.11	11.00	23.91	14.00	33.33	1.00	5.88	30.00	22.06
Northeast	2.00	50.00	8.00	29.63	12.00	26.09	14.00	33.33	3.00	17.65	39.00	28.68
Southeast			4.00	14.81	10.00	21.74	7.00	16.67	7.00	41.18	28.00	20.59

Also organized by adopter category, Table 11 includes means and standard deviations indicative of responding SBAE program's estimated percentages of student participation for each of the six types of SAE programs. Of the responding programs (n = 136) and regardless of their adopter categories, entrepreneurship was the SAE program type with the highest mean (M = 43.97; SD = 23.17), and service learning was the SAE program type with the lowest mean (M = 2.20; SD = 4.89). In the case of the innovators (n = 4), placement received the second highest mean of the six program types (M = 23.75; SD = 14.93), and was followed by exploratory (M = 14.00; SD = 24.10), research (M = 3.25; SD = 2.36), and school-based enterprise (M = .25; SD = 0.50). The placement SAE program type was also afforded the second highest mean (M = 21.85; SD = 17.92) by the early adopters (n = 27), but was followed by exploratory (M = 18.96; SD = 18.39), school-based enterprise (M = 8.26; SD = 14.46), and research (M = 5.65; SD = 10.94). However, the exploratory SAE was identified as the second most prominent type among the early majority (M = 26.78; SD = 28.83), late majority (M = 25.21; SD = 27.90), and laggards (M = 23.59; SD = 22.96). For the early majority (n = 46), the exploratory SAE type was followed by placement (M = 19.39; SD = 13.45), research (M = 6.58; SD = 14.37), and school-based enterprise (M = 3.59; SD = 8.19). For the late majority (n = 42), exploratory was followed by placement (M = 20.32; SD = 15.57), school-based enterprise (M = 3.76; SD = 7.18), and research (M = 2.39; SD = 4.29). Lastly, the laggards (n = 17) followed the exploratory SAE type with placement (M = 14.94; SD = 12.11), research (M = 8.41; SD = 15.32), and school-based enterprise (M = 6.94; SD = 15.54; see Table 11).

Table 11

Participating SBAE Programs' Percentage of Student Participation in Each of the Six SAE Program Types by Adopter Category

	Innovators (n = 4)		Early Adopters (n = 27)		Early Majority (n = 46)		Late Majority (n = 42)		Laggards (n = 17)		Total (n = 136)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Entrepreneurship	58.75	14.36	42.50	19.37	41.72	25.15	46.69	21.96	42.18	27.79	43.97	23.17
Placement	23.75	14.93	21.85	17.92	19.39	13.45	20.32	15.57	14.94	12.11	19.74	14.92
Research	3.25	2.36	5.65	10.94	6.58	14.37	2.39	4.29	8.41	15.32	5.23	11.40
Exploratory	14.00	24.10	18.96	18.39	26.78	28.83	25.21	27.90	23.59	22.96	23.97	25.42
School-Based Enterprise	0.25	0.50	8.26	14.46	3.59	8.19	3.76	7.18	6.94	15.54	4.89	10.55
Service Learning	0.00	0.00	2.78	5.22	1.93	4.85	1.62	3.47	3.94	7.35	2.20	4.89

Findings Pertaining to Research Question Three

Research question three was intended to describe selected personal and professional characteristics of Oklahoma SBAE teachers in each of the five adopter categories. Table 12 is organized by adopter category and is comprised of frequencies and percentages regarding the participants' sex and race/ethnicity. In the case of the innovators (n = 4), 100% of the participants were white males. In contrast, approximately 72% of the participants categorized as early adopters (n = 29) were male and 28% were female. In addition, approximately 72% of these participants identified as white, 24% as American Indian or Alaska Native, and 3% as other. Approximately 79% of participating SBAE teachers in the early majority (n = 48) were male, and the other 21% were female. Nearly 88% of these participants identified as white, 10% as American Indian or Alaska Native, and 2% as other. Participating SBAE teachers categorized as being part of the late majority (n = 47) were found to be approximately 81% male and 19% female, as well as 72% white and 28% American Indian or Alaska Native. Lastly, of the SBAE teachers categorized as laggards (n = 18), approximately 72% were male and 28% were female. Further, nearly 78% were white, and the remaining 22% were American Indian or Alaska Native. In total (n = 146), roughly 78% of participants were male and 22% were female. Moreover, approximately 79% of all participants identified as white, 20% as American Indian or Alaska Native, and 1% as other (see Table 12).

Table 12

Selected Personal Characteristics of Participants by Adopter Category: Sex and Race/Ethnicity

	Innovators (*n* = 4)		Early Adopters (*n* = 29)		Early Majority (*n* = 48)		Late Majority (*n* = 47)		Laggards (*n* = 18)		Total (*n* = 146)	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Sex												
Male	4.00	100.00	21.00	72.41	38.00	79.17	38.00	80.90	13.00	72.20	114.00	78.10
Female			8.00	27.59	10.00	20.83	9.00	19.10	5.00	27.80	32.00	21.90
Race/Ethnicity												
White	4.00	100.00	21.00	72.41	42.00	87.50	34.00	72.30	14.00	77.80	115.00	78.77
Black or African American												
American Indian or Alaska Native			7.00	24.14	5.00	10.42	13.00	27.70	4.00	22.20	29.00	19.86
Asian												
Native Hawaiian or Other Pacific Islander												
Other			1.00	3.45	1.00	2.08					2.00	1.37

Frequencies and percentages indicative of the participants' teaching credentials, conferred degrees, and computer skill level are shown in Table 13. Of the participants teaching in programs categorized as innovators (n = 4), 75% were traditionally certified to teach, and 25% were alternatively certified. Moreover, 75% of the innovators held Bachelor's degrees, and 25% held an Education Specialist degree. Fifty percent of the innovators considered their computer skill level to be *excellent*, and 50% viewed their computer skill level to be *good*.

Approximately 93% of the participating SBAE teachers categorized as the early adopters (n = 29) obtained traditional teacher certification, whereas the remaining 7% obtained alternative certification. In addition, roughly 62% of these teachers held a Bachelor's degree, just over 34% held a Master's degree, and 3% selected other. As for their perceived computer skill levels, approximately 41% selected *excellent*, 45% indicated *good*, and 14% chose *fair*.

Of those participants belonging to the early majority (n = 48), roughly 85% were traditionally certified to teach, and 15% were alternatively certified. Further, nearly 73% of these participants held a Bachelor's degree, and 27% had earned a Master's degree. Approximately 38% of these teachers viewed their computer skill level as *excellent*, 54% as *good*, and 8% as *fair*.

In the case of the late majority (n = 47), about 89% of participants obtained traditional teacher certification, whereas 11% obtained alternative certification. Moreover, 83% held a Bachelor's degree, and 17% held a Master's degree. Nearly 30% of the participants described their computer skill level as *excellent*, 51% as *good*, 17% as *fair*, and 2% as *poor*.

Nearly 89% of the participants categorized as laggards (n = 18) were traditionally certified to teach, and the remaining 11% were alternatively certified. Further, approximately 83% held a Bachelor's degree, and 17% held a Master's degree. Roughly 33% of these participants described their computer skill level as *excellent*, 56% as *good*, and 11% as *fair* (see Table 13).

Table 13

Selected Professional Characteristics of Participants by Adopter Category: Certification, Education, and Computer Skill Level

	Innovators (*n* = 4)		Early Adopters (*n* = 29)		Early Majority (*n* = 48)		Late Majority (*n* = 47)		Laggards (*n* = 18)		Total (*n* = 146)	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Certification Path												
Traditional	3.00	75.00	27.00	93.10	41.00	85.42	42.00	89.40	16.00	88.90	129.00	88.36
Alternative	1.00	25.00	2.00	6.90	7.00	14.58	5.00	10.60	2.00	11.10	17.00	11.64
Emergency												
Other												
Highest Degree Conferred												
Bachelor's	3.00	75.00	18.00	62.07	35.00	72.92	39.00	83.00	15.00	83.30	110.00	75.34
Master's			10.00	34.48	13.00	27.08	8.00	17.00	3.00	16.70	34.00	23.29
Education Specialist	1.00	25.00									1.00	0.68
Doctorate												
Other			1.00	3.45							1.00	0.68
Computer Skill Level												
Excellent	2.00	50.00	12.00	41.38	18.00	37.50	14.00	29.79	6.00	33.33	52.00	35.62
Good	2.00	50.00	13.00	44.83	26.00	54.17	24.00	51.06	10.00	55.56	75.00	51.37
Fair			4.00	13.79	4.00	8.33	8.00	17.02	2.00	11.11	18.00	12.33
Poor							1.00	2.13			1.00	0.68

Means and standard deviations describing the participants' age, years of experience teaching SBAE, and years of experience teaching SBAE in their current programs are displayed in Table 14. In addition, Table 14 includes the means and standard deviations of participants' city or town populations. The means found for the age of participants by adopter category were 48.50 (*SD* = 11.27) for the innovators (*n* = 4), 39.83 (*SD* = 11.43) for the early adopters (*n* = 29), 37.50 (*SD* = 10.35) for the early majority (*n* = 48), 37.55 (*SD* = 12.66) for the late majority (*n* = 47), and 32.83 (*SD* = 8.87) for the laggards (*n* = 18). The means found for the participants' years of experience teaching SBAE were 17.75 (*SD* = 15.84) for the innovators, 14.67 (*SD* = 10.94) for the early adopters, 12.39 (*SD* = 9.57) for the early majority, 12.45 (*SD* = 10.96) for the late majority, and 7.44 (*SD* = 6.55) for the laggards. The means for the number of years participants spent teaching in their current schools were 17.00 (*SD* = 15.38) for the innovators, 9.61 (*SD* = 11.35) for the early adopters, 8.41 (*SD* = 7.75) for the early majority, 7.15 (*SD* = 6.44) for the late majority, and 3.00 (*SD* = 1.71) for the laggards. Lastly, the mean population sizes of participants' cities or towns of residence were 4,258.75 (*SD* = 7,177.13) for the innovators, 14,818.69 (*SD* = 30,091.36) for the early adopters, 2,307.36 (*SD* = 3,147.25) for the early majority, 7,175.22 (*SD* = 16,820.77) for the late majority, and 1,293.56 (*SD* = 992.70) for the laggards.

In total, the mean age of all participants (*n* = 146) was 37.71 (*SD* = 11.39). The mean number of years teaching SBAE among all participants was 12.40 (*SD* = 10.30). Regarding the number of years teaching in their current schools, the mean found for all responding SBAE teachers was 8.02 (*SD* = 8.46). Finally, the mean population size of every participants' city or town of residence was 6,281.89 (*SD* = 17,097.65; see Table 14).

Table 14

Selected Personal and Professional Characteristics of Participants by Adopter Category: Age, Years Teaching Agricultural Education, Years Teaching at Current School, and Population of City or Town of Residence

	Innovators (n = 4)		Early Adopters (n = 29)		Early Majority (n = 48)		Late Majority (n = 47)		Laggards (n = 18)		Total (n = 146)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age	48.50	11.27	39.83	11.43	37.50	10.35	37.55	12.66	32.83	8.87	37.71	11.39
Years teaching SBAE	17.75	15.84	14.67	10.94	12.39	9.57	12.45	10.96	7.44	6.55	12.40	10.30
Years teaching at current school	17.00	15.38	9.61	11.35	8.41	7.75	7.15	6.64	3.00[a]	1.71	8.02[c]	8.46
City or town population	4258.75	7177.13	14818.69	30091.36	2307.36	3147.25	7175.22[b]	16820.77	1293.56	992.70	6281.89[d]	17097.65

Note. [a]Only 12 responses (n = 12) were received for this particular item. [b]Only 46 responses (n = 46) were received for this item. [c]Only 140 responses (n = 140) were received for this item. [d]Only 145 responses (n = 145) were received for this item.

Findings Pertaining to Research Question Four

Research question four was intended to describe the participants' perceptions of the AET based on Rogers' (2003) five attributes of innovations: relative advantage, compatibility, complexity, trialability, and observability. To interpret the findings derived from the associated Likert-type items, the following real limits were observed: *Strongly disagree* = 1.00 to 1.49; *Disagree* = 1.50 to 2.49; *Neutral* = 2.50 to 3.49; *Agree* = 3.50 to 4.49; and *Strongly agree* = 4.50 to 5.00. The means and standard deviations of the participants' responses to the individual items comprising each of the five attribute constructs are presented by adopter category in Tables 15 through 19. Table 20 includes the composite means and standard deviations for each attribute construct according to adopter category.

All means and standard deviations pertaining to each of the items in the relative advantage construct are organized and displayed by adopter category in Table 15. Of the respondents categorized as innovators (n = 4), means ranged from 3.75 (SD = 1.50) to 4.40 (SD = 0.58), with the statement "Using the AET for SAE record keeping could make compiling FFA degree and award applications more convenient than traditional, pen-and-paper record keeping practices" receiving the highest mean, and the statements "Using the AET for SAE record keeping could be less time consuming than traditional, pen-and-paper record keeping practices" and "Using the AET for SAE record keeping could allow me to supervise and assess SAE projects more effectively than traditional, pen-and-paper record keeping practices" receiving the lowest means.

The means provided by the early adopters (n = 30) for each of the relative advantage statements ranged from 3.23 (SD = 1.19) to 3.98 (SD = 1.18), with the statement "Using the AET for SAE record keeping could make compiling FFA degree and award applications more convenient than traditional, pen-and-paper record keeping practices" receiving the highest mean,

and “Using the AET for SAE record keeping could provide me access to more instructional resources pertaining to SAE supervision than traditional, pen-and-paper record keeping practices” receiving the lowest mean.

The remaining three adopter categories were found to have the highest and lowest means for the same two statements in the relative advantage construct. The statement “Using the AET for SAE record keeping could make compiling FFA degree and award applications more convenient than traditional, pen-and-paper record keeping practices” received the highest mean from the early majority (n = 51; M = 4.24; SD = 0.93), the late majority (n = 50; M = 3.73; SD = 1.01), and the laggards (n = 21; M = 3.81; SD = 1.17). However, the statement “Using the AET for SAE record keeping could be less time consuming than traditional, pen-and-paper record keeping practices” received the lowest mean from the early majority (M = 3.46; SD = 1.31), the late majority (M = 2.84; SD = 1.35), and the laggards (M = 2.76; SD = 1.41).

Of all 156 participants, the means for this construct ranged from 3.19 (SD = 1.37) to 3.97 (SD = 1.05). The statement “Using the AET for SAE record keeping could make compiling FFA degree and award applications more convenient than traditional, pen-and-paper record keeping practices” was found to have the highest mean, and the statement “Using the AET for SAE record keeping could be less time consuming than traditional, pen-and-paper record keeping practices” was found to have the lowest mean (see Table 15).

Table 15

Participants' Perceptions of the AET Based on Rogers' (2003) Attributes of Innovations by Adopter Category: Relative Advantage

	Innovators (n = 4)		Early Adopters (n = 30)		Early Majority (n = 51)		Late Majority (n = 50)		Laggards (n = 21)		Total (n = 156)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Using the AET for SAE record keeping could be less time consuming than traditional, pen-and-paper record keeping practices	3.75	1.50	3.53	1.33	3.46	1.31	2.84	1.35	2.76	1.41	3.19	1.37
Using the AET for SAE record keeping could allow me to supervise and assess SAE projects more effectively than traditional, pen-and-paper record keeping practices	3.75	1.50	3.60	1.33	3.49	1.22	2.98	1.25	2.83	1.28	3.27	1.29
Using the AET for SAE record keeping could provide me access to more instructional resources pertaining to SAE supervision than traditional, pen-and-paper record keeping practices	4.25	0.50	3.23	1.19	3.63	1.08	3.06	1.08	3.05	1.24	3.31	1.14
Using the AET for SAE record keeping could make compiling FFA degree and award applications more convenient than traditional, pen-and-paper record keeping practices	4.40	0.58	3.98	1.18	4.24	0.93	3.73	1.01	3.81	1.17	3.97	1.05

Note. Scale items: 1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Neutral*; 4 = *Agree*; and 5 = *Strongly agree*.

Table 16 is organized by adopter category and includes the means and standard deviations of the participants' responses to each item in the compatibility construct. The statement "Using the AET for SAE record keeping is readily available for my use" received the highest mean among each of the adopter categories (n = 156; M = 3.79; SD = 1.08), whereas the statement "Using the AET for SAE record keeping is well-suited to my current teaching conditions" received the lowest mean (M = 2.81; SD = 1.21). For the participants belonging to SBAE programs categorized as innovators (n = 4), means ranged from 3.25 (SD = 1.71) to 4.75 (SD = 0.50). However, the statements "Using the AET for SAE record keeping is well-suited to my current teaching conditions" and "Using the AET for SAE record keeping fits well with the way I like to supervise and evaluate SAEs" received the same mean from the innovators.

In the case of the early adopters (n = 30), the means by item in the compatibility construct ranged from 3.03 (SD = 1.16) to 4.10 (SD = 0.80). The means by item found for the early majority (n = 51) ranged from 3.05 (SD = 1.20) to 3.97 (SD = 0.98). For the late majority (n = 50), the means by item ranged from 2.49 (SD = 1.12) to 3.55 (SD = 1.10). Finally, the means found for the laggards (n = 21) ranged from 2.55 (SD = 1.32) to 3.29 (SD = 1.38; see Table 16).

Table 16

Participants' Perceptions of the AET Based on Rogers' (2003) Attributes of Innovations by Adopter Category: Compatibility

	Innovators (n = 4)		Early Adopters (n = 30)		Early Majority (n = 51)		Late Majority (n = 50)		Laggards (n = 21)		Total (n = 156)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Using the AET for SAE record keeping is compatible with my teaching philosophy	3.75	1.89	3.53	0.97	3.50	1.09	2.78	0.92	2.86	1.24	3.20	1.11
Using the AET for SAE record keeping is well-suited to my current teaching conditions	3.25	1.71	3.03	1.16	3.05	1.20	2.49	1.12	2.55	1.32	2.81	1.21
Using the AET for SAE record keeping fits well with the way I like to supervise and evaluate SAEs	3.25	1.71	3.07	1.14	3.21	1.05	2.58	1.02	2.60	1.28	2.90	1.13
Using the AET for SAE record keeping is readily available for my use	4.75	0.50	4.10	0.80	3.97	0.98	3.55	1.10	3.29	1.38	3.79	1.08
Using the AET for SAE record keeping is readily available for use by my students	4.00	1.41	3.80	0.92	3.63	1.23	2.97	1.30	2.93	1.40	3.37	1.27

Note. Scale items: 1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Neutral*; 4 = *Agree*; and 5 = *Strongly agree*.

The means and standard deviations for each item within the complexity construct are presented in Table 17. In the case of all five adopter categories (n = 156), the statement "The AET is easy for me to use and navigate" received the highest mean (M = 2.43; SD = 1.13). However, the statements receiving the lowest means varied slightly by adopter category. For the innovators (n = 4), means for each of the four statements ranged from 2.50 (SD = 1.29) to 3.25 (SD = 1.71), with the statement "The AET is simple to learn" receiving the lowest mean. In contrast, the early adopters' (n = 30) means by item ranged from 2.08 (SD = 0.98) to 2.75 (SD = 1.25), and the statement "The AET is clear and understandable" was afforded the lowest mean.

The means for the early majority (n = 51) ranged from 2.24 (SD = 1.07) to 2.62 (SD = 1.11), with the statement "The AET is easy for my students to use and navigate" receiving the lowest mean. As for the late majority (n = 50), means ranged from 1.76 (SD = 0.84; SD = 0.74) to 2.06 (SD = 0.95), with the statements "The AET is clear and understandable" and "The AET is easy for my students to use and navigate" sharing the lowest mean. Finally, the laggards (n = 21) had means ranging from 1.88 (SD = 1.00) to 2.24 (SD = 1.09), with the statement "The AET is simple to learn" receiving the lowest mean. Of all 156 participants, the statement "The AET is clear and understandable" was found to have the lowest mean of the four complexity statements (M = 2.03; 1.01). However, the statement "The AET is easy for my students to use and navigate" followed closely with a mean of 2.04 (SD = 1.01; see Table 17).

Table 17

Participants' Perceptions of the AET Based on Rogers' (2003) Attributes of Innovations by Adopter Category: Complexity

	Innovators (n = 4)		Early Adopters (n = 30)		Early Majority (n = 51)		Late Majority (n = 50)		Laggards (n = 21)		Total (n = 156)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
The AET is clear and understandable	2.75	1.50	2.08	0.98	2.25	1.06	1.76	0.84	1.93	1.08	2.03	1.01
The AET is simple to learn	2.50	1.29	2.15	1.17	2.48	1.29	1.77	0.79	1.88	1.00	2.11	1.11
The AET is easy for me to use and navigate	3.25	1.71	2.75	1.25	2.62	1.11	2.06	0.95	2.24	1.09	2.43	1.13
The AET is easy for my students to use and navigate	2.75	1.71	2.13	1.11	2.24	1.07	1.76	0.74	1.98	1.01	2.04	1.01

Note. Scale items: 1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Neutral*; 4 = *Agree*; and 5 = *Strongly agree*.

Table 18 is comprised of the means and standard deviations found for each of the four statements in the trialability construct. For the innovators (n = 4), item means ranged from 3.75 (SD = 0.96) to 4.50 (SD = 0.58), with the statement "I have adequate opportunities to sample the AET" receiving the highest mean, and the statement "I have access to someone who can help me try the AET" receiving the lowest mean. Means found for the early adopters (n = 30) ranged from 3.35 (SD = 1.01) to 3.47 (SD = 1.13). Of the four statements, the early adopters afforded the statement "I have the knowledge of where I can go to satisfactorily try the AET" the highest mean, and the statement "I have the means to experiment with the AET" the lowest mean. In the case of the early majority (n = 51), the means for each item ranged from 3.46 (SD = 1.17) to 3.59 (SD = 0.94), with the statement "I have adequate opportunities to sample the AET" receiving the highest mean, and the statement "I have access to someone who can help me try the AET" receiving the lowest mean. The statement "I have adequate opportunities to sample the AET" was also afforded the highest mean by the late majority (n = 50; M = 3.34; SD = 1.02). However, the statement receiving the lowest mean among the late majority was "I have the knowledge of where I can go to satisfactorily try the AET" (M = 3.03; SD = 1.03). For the laggards (n = 21), the item means ranged from 3.05 (SD = 1.02) to 3.29 (SD = 1.15), with the statement "I have the means to experiment with the AET" receiving the highest mean, and the statement "I have the knowledge of where I can go to satisfactorily try the AET" receiving the lowest mean. Of all 156 respondents, means ranged from 3.29 (SD = 1.06; SD = 1.12) to 3.44 (SD = 1.04). The statement "I have adequate opportunities to sample the AET" was afforded the highest mean, and the statements "I have the knowledge of where I can go to satisfactorily try the AET" and "I have access to someone who can help me try the AET" shared the lowest mean (see Table 18).

Table 18

Participants' Perceptions of the AET Based on Rogers' (2003) Attributes of Innovations by Adopter Category: Trialability

	Innovators (n = 4)		Early Adopters (n = 30)		Early Majority (n = 51)		Late Majority (n = 50)		Laggards (n = 21)		Total (n = 156)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
I have adequate opportunities to sample the AET	4.50	0.58	3.42	1.20	3.59	0.94	3.34	1.02	3.17	1.06	3.44	1.04
I have the knowledge of where I can go to satisfactorily try the AET	4.25	0.50	3.47	1.13	3.48	1.03	3.03	1.03	3.05	1.02	3.29	1.06
I have the means to experiment with the AET	4.00	0.82	3.35	1.01	3.54	1.01	3.19	1.08	3.29	1.15	3.37	1.05
I have access to someone who can help me try the AET	3.75	0.96	3.37	1.09	3.46	1.17	3.13	1.13	3.07	1.03	3.29	1.12

Note. Scale items: 1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Neutral*; 4 = *Agree*; and 5 = *Strongly agree*.

The means and standard deviations found for each item comprising the observability construct are displayed in Table 19. For those participating teachers belonging to SBAE programs categorized as innovators (n = 4), the statements "I have knowledge of teachers who are using the AET" (M = 4.25; SD = 0.50) and "I have become aware of the limitations of the AET" (M = 4.25; SD = 0.50) shared the highest mean of the four items. However, the statement "I have opportunities to observe others using the AET" (M = 3.50; SD = 1.29) was found to have the lowest mean. Similarly, the early adopters (n = 30) afforded the statement "I have become aware of the limitations of the AET" (M = 4.00; SD = 0.80) the highest mean, and the statement "I have opportunities to observe others using the AET" (M = 3.15; SD = 0.96) the lowest mean. As for those in the early majority (n = 51), the highest mean was found for the statement "I have knowledge of teachers who are using the AET" (M = 3.83; SD = 0.77), and the lowest mean was found for the statement "I have opportunities to observe others using the AET" (M = 3.27; SD = 0.94). In the case of the late majority (n = 50), the highest mean was found for the statement "I have become aware of the limitations of the AET" (M = 3.65; SD = 1.09), and the lowest mean was found for the statement "I have opportunities to observe others using the AET" (M = 3.12; SD = 1.06). Finally, for the laggards (n = 21), the highest mean found was for the statement "I have become aware of the limitations of the AET" (M = 3.36; SD = 1.30), and the lowest mean found was for the statement "I have knowledge of teachers who are using the AET" (M = 2.98; SD = 1.35). In total (n = 156), the statement "I have become aware of the limitations of the AET" (M = 3.69; SD = 1.04) had the highest mean, and the statement "I have opportunities to observe others using the AET" (M = 3.17; SD = 1.02) had the lowest mean (see Table 19).

Table 19

Participants' Perceptions of the AET Based on Rogers' (2003) Attributes of Innovations by Adopter Category: Observability

	Innovators (n = 4)		Early Adopters (n = 30)		Early Majority (n = 51)		Late Majority (n = 50)		Laggards (n = 21)		Total (n = 156)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
I have knowledge of teachers who are using the AET	4.25	0.50	3.95	0.70	3.83	0.77	3.54	0.98	2.98	1.35	3.66	0.96
I have opportunities to observe others using the AET	3.50	1.29	3.15	0.96	3.27	0.94	3.12	1.06	3.00	1.22	3.17	1.02
I have become aware of the benefits of the AET	4.00	0.82	3.45	1.02	3.60	0.96	3.26	0.95	3.26	1.26	3.43	1.01
I have become aware of the limitations of the AET	4.25	0.50	4.00	0.80	3.64	1.00	3.65	1.09	3.36	1.30	3.69	1.04

Note. Scale items: 1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Neutral*; 4 = *Agree*; and 5 = *Strongly agree*.

As for the means and standard deviations found for each of the five attribute constructs, data are presented by adopter category in Table 20. In the case of all five adopter categories (n = 156), the complexity construct was found to have the lowest mean (M = 2.15; SD = 0.94). Specifically, the complexity construct means found for each category were 2.81 (SD = 1.52) for the innovators (n = 4), 2.28 (SD = 0.96) for the early adopters (n = 30), 2.40 (SD = 1.00) for the early majority (n = 51), 1.84 (SD = 0.70) for the late majority (n = 50), and 2.01 (SD = 0.98) for the laggards (n = 21). Conversely, observability received the highest attribute construct mean among the early adopters (M = 3.64; SD = 0.66), the late majority (M = 3.39; SD = 0.70), and the laggards (M = 3.15; SD = 1.02), and was also found to have the highest construct mean overall (M = 3.49; SD = 0.74). As for the two remaining adopter categories, trialability received the highest construct mean (M = 4.13; SD = 0.66) for the innovators, and relative advantage received the highest construct mean (M = 3.70; SD = 0.93) for the early majority (see Table 20).

Table 20

Participants' Perceptions of the AET Based on Rogers' (2003) Attributes of Innovations by Adopter Category

	Innovators (n = 4)		Early Adopters (n = 30)		Early Majority (n = 51)		Late Majority (n = 50)		Laggards (n = 21)		Total (n = 156)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Relative Advantage	4.06	0.94	3.59	1.07	3.70	0.93	3.15	0.92	3.11	1.10	3.43	1.01
Compatibility	3.80	1.10	3.51	0.76	3.47	0.89	2.87	0.85	2.84	1.09	3.21	0.94
Complexity	2.81	1.52	2.28	0.96	2.40	1.00	1.84	0.70	2.01	0.98	2.15	0.94
Trialability	4.13	0.66	3.40	0.91	3.52	0.90	3.17	0.92	3.14	0.85	3.35	0.91
Observability	4.00	0.71	3.64	0.66	3.59	0.66	3.39	0.70	3.15	1.02	3.49	0.74

Note. This analysis was based on mean scores of the constructs. Scale items: 1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Neutral*; 4 = *Agree*; and 5 = *Strongly agree*.

Findings Pertaining to Research Question Five

Research question five sought to describe the participants' perceptions of selected barriers to diffusion of the AET. The selected barriers identified for this portion of the study included "concerns about time," "credibility of the AET," "lack of support," "fear of technology," "technical expertise," and "lack of resources." For the purpose of interpretation, the following real limits were observed for the associated scale items: *No barrier* = 1.00 to 1.49; *Weak barrier* = 1.50 to 2.49; *Moderate barrier* = 2.50 to 3.49; *Strong barrier* = 3.50 to 4.49; and *Very strong barrier* = 4.50 to 5.00. Tables 21 through 26 present the means and standard deviations found for the individual items making up each of the six barrier constructs. Table 27 provides the composite means and standard deviations found for each barrier construct by adopter category.

The means and standard deviations found for the three items making up the "concerns about time" construct are displayed in Table 21. The statement "Increased time for teachers to familiarize students with the AET" received the highest mean among the innovators (n = 4; M = 4.00; SD = 0.82), the early adopters (n = 29; M = 3.81; SD = 1.14), the early majority (n = 49; M = 3.55; SD = 0.94), and the late majority (n = 45; M = 3.84; SD = 1.07), and was also found to have the highest mean overall (n = 147; M = 3.74; SD = 1.04). In contrast, the statement "Increased time for the web-based evaluation and assessment of student records" received the lowest mean among the early adopters (M = 3.07; SD = 1.19), early majority (M = 3.01; SD = 1.08), late majority (M = 3.33; SD = 0.95), and laggards (n = 20; M = 3.65; SD = 1.18), as well as the lowest mean overall (M = 3.23; SD = 1.09). However, the statement "Increased time for teachers to become familiar with the AET" was found to have the lowest mean among the innovators (M = 3.25; SD = 0.50), and the highest mean among the laggards (M = 3.85; SD = 0.99; see Table 21).

Table 21

Participants' Perceptions of Selected Barriers to Diffusion of the AET by Adopter Category: Concerns About Time

	Innovators (n = 4)		Early Adopters (n = 29)		Early Majority (n = 49)		Late Majority (n = 45)		Laggards (n = 20)		Total (n = 147)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Increased time for teachers to become familiar with the AET	3.25	0.50	3.50	1.02	3.41	0.96	3.58	0.96	3.85	0.99	3.53	0.97
Increased time for teachers to familiarize students with the AET	4.00	0.82	3.81	1.14	3.55	0.94	3.84	1.07	3.83	1.14	3.74	1.04
Increased time for the web-based evaluation and assessment of student records	3.75	0.96	3.07	1.19	3.01	1.08	3.33	0.95	3.65	1.18	3.23	1.09

Note. Scale items: 1 = *No barrier*; 2 = *Weak barrier*; 3 = *Moderate barrier*; 4 = *Strong barrier*; and 5 = *Very strong barrier*.

Table 22 includes the means and standard deviations found for each of the four statements comprising the "credibility of the AET" construct regarding perceived barriers to adoption and use of the AET. For the innovators (n = 4), the statement "Concerns about the evaluation and assessment of student records using the AET" (M = 3.00; SD = 0.82) was found to have the highest mean, and the statements "Concerns that the AET lowers the quality of student records" (M = 2.25; SD = 1.26) and "Concerns that the AET lowers the expectations of student records" (M = 2.25; SD = 1.26) shared the lowest mean. Similarly, the statement "Concerns about the evaluation and assessment of student records using the AET" had the highest mean among the early adopters (n = 29; M = 3.21; SD = 1.24) and the early majority (n = 49; M = 2.87; SD = 1.01), and the statement "Concerns that the AET lowers the expectations of student records" had the lowest mean among the early adopters (M = 2.47; SD = 1.30), the early majority (M = 2.35; SD = 1.16), and the late majority (n = 45; M = 3.17; SD = 1.16). The statement "Concerns that the AET lowers the quality of student records" was found to have the highest mean for the late majority (M = 3.41; SD = 1.12), but the lowest mean for the laggards (n = 20; M = 2.80; SD = 1.51). In addition to receiving the highest mean among the laggards (M = 3.30; SD = 1.30), the statement "Lack of confidence or trust in the AET among agricultural education teachers and supporters" also had the highest mean for all 147 respondents as a group (M = 3.12; SD = 1.24). Further, the statement "Concerns that the AET lowers the expectations of student records" had the lowest mean for the overall group (M = 2.71; SD = 1.28; see Table 22).

Table 22

Participants' Perceptions of Selected Barriers to Diffusion of the AET by Adopter Category: Credibility of the AET

	Innovators (*n* = 4)		Early Adopters (*n* = 29)		Early Majority (*n* = 49)		Late Majority (*n* = 45)		Laggards (*n* = 20)		Total (*n* = 147)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Lack of confidence or trust in the AET among agricultural education teachers and supporters	2.50	0.58	3.19	1.21	2.83	1.26	3.37	1.21	3.30	1.30	3.12	1.24
Concerns about the evaluation and assessment of student records using the AET	3.00	0.82	3.21	1.24	2.87	1.01	3.38	1.13	2.98	1.34	3.11	1.15
Concerns that the AET lowers the quality of student records	2.25	1.26	2.74	1.38	2.54	1.32	3.41	1.12	2.80	1.51	2.87	1.34
Concerns that the AET lowers the expectations of student records	2.25	1.26	2.47	1.30	2.35	1.16	3.17	1.16	2.98	1.53	2.71	1.28

Note. Scale items: 1 = *No barrier*; 2 = *Weak barrier*; 3 = *Moderate barrier*; 4 = *Strong barrier*; and 5 = *Very strong barrier*.

The item means and standard deviations for the "lack of support" construct regarding perceived barriers to adoption and use of the AET are reported in Table 23. In the case of the participants in all five adopter categories (n = 147), the statement "Lack of agreement concerning the role of the AET among agricultural education teachers and supporters" was found to have the highest mean (M = 3.15; SD = 1.11). Specifically, the statement means found for each category were 3.00 (SD = .82) for the innovators (n = 4), 3.19 (SD = 1.15) for the early adopters (n = 29), 2.90 (SD = 1.18) for the early majority (n = 49), 3.33 (SD = 0.99) for the late majority (n = 45), and 3.35 (SD = 1.18) for the laggards (n = 20). Conversely, the statement "Lack of an advocate for the AET" was found to have the lowest mean among the early adopters (M = 2.64; SD = 1.08), the early majority (M = 2.57; SD = 1.14), the late majority (M = 2.80; SD = 1.02), and the laggards (M = 2.90; SD = 1.07), as well as the lowest mean overall (M = 2.70; SD = 1.06). As for the innovators, the statement "Lack of need (perceived or real) for the AET" was identified as the statement with the lowest mean (M = 2.25; SD = 0.96; see Table 23).

Table 23

Participants' Perceptions of Selected Barriers to Diffusion of the AET by Adopter Category: Lack of Support

	Innovators (n = 4)		Early Adopters (n = 29)		Early Majority (n = 49)		Late Majority (n = 45)		Laggards (n = 20)		Total (n = 147)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Lack of need (perceived or real) for the AET	2.25	0.96	2.79	1.21	2.67	1.25	3.00	0.90	3.20	1.06	2.86	1.12
Lack of agreement concerning the role of the AET among agricultural education teachers and supporters	3.00	0.82	3.19	1.15	2.90	1.18	3.33	0.99	3.35	1.18	3.15	1.11
Lack of an advocate for the AET	2.50	0.58	2.64	1.08	2.57	1.14	2.80	1.02	2.90	1.07	2.70	1.06

Note. Scale items: 1 = *No barrier*; 2 = *Weak barrier*; 3 = *Moderate barrier*; 4 = *Strong barrier*; and 5 = *Very strong barrier*.

Table 24 is comprised of the means and standard deviations found for the statements within the "fear of technology" construct regarding perceived barriers to adoption and use of the AET. For the innovators (n = 4), the statement "Threat to teachers' sense of competence and authority regarding SAE record keeping" was found to have the highest mean (M = 2.50; SD = 1.29), and the statement "Concerns about potential misuse of the Internet by students" had the lowest mean (M = 1.25; SD = 0.50). Further, the statement "Threat to teachers' sense of competence and authority regarding SAE record keeping" was also found to have the highest mean for the early adopters (n = 29; M = 2.76; SD = 1.38), and "Concern for the security of students' SAE records (e.g., hackers, computer viruses)" was the statement found to have the lowest mean (M = 2.19; SD = 1.15). As for the three remaining adopter categories, the statement "Concerns about potential misuse of the Internet by students" had the highest mean among the early majority (n = 49; M = 2.48; SD = 1.21), the late majority (n = 45; M = 2.99; SD = 1.28), and the laggards (n = 20; M = 2.90; SD = 1.41). Conversely, the statement "Concern for the security of students' SAE records (e.g., hackers, computer viruses)" had the lowest mean among the early majority (M = 2.18; SD = 1.24), the late majority (M = 2.80; SD = 1.39), and the laggards (M = 2.13; SD = 1.28). In total (n = 147), the statements "Threat to teachers' sense of competence and authority regarding SAE record keeping" (M = 2.66; SD = 1.21) and "Concerns about potential misuse of the Internet by students" (M = 2.66; SD = 1.29) shared the highest mean, and the statement "Concern for the security of students' SAE records (e.g., hackers, computer viruses)" had the lowest mean (M = 2.35; SD = 1.29; see Table 24).

Table 24

Participants' Perceptions of Selected Barriers to Diffusion of the AET by Adopter Category: Fear of Technology

	Innovators (n = 4)		Early Adopters (n = 29)		Early Majority (n = 49)		Late Majority (n = 45)		Laggards (n = 20)		Total (n = 147)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Threat to teachers' sense of competence and authority regarding SAE record keeping	2.50	1.29	2.76	1.38	2.46	1.10	2.82	1.03	2.65	1.57	2.66	1.21
Concern for the security of students' SAE records (e.g., hackers, computer viruses)	1.75	0.96	2.19	1.15	2.18	1.24	2.80	1.39	2.13	1.28	2.35	1.29
Concerns about potential misuse of the Internet by students	1.25	0.50	2.48	1.31	2.48	1.21	2.99	1.28	2.90	1.41	2.66	1.29

Note. Scale items: 1 = *No barrier*; 2 = *Weak barrier*; 3 = *Moderate barrier*; 4 = *Strong barrier*; and 5 = *Very strong barrier*.

The means and standard deviations found for the statements comprising the "technical expertise" construct regarding perceived barriers to adoption and use of the AET are shown in Table 25. In the case of the innovators (n = 4), the statement "Lack of technical support at the school level" received the highest mean (M = 3.50; SD = 1.00), and the statement "Lack of technical support from the AET" received the lowest mean (M = 1.25; SD = 0.50). For the early adopters (n = 29), the statement "Lack of knowledge about the AET" was found to have the highest mean (M = 3.03; SD = 1.32), and the statement "Lack of technical support from the AET" had the lowest mean (M = 2.28; SD = 0.96). The early majority (n = 49) afforded the statement "Lack of knowledge about the AET" the highest mean (M = 3.04; SD = 1.10), and the statement "Lack of teacher in-service, training or professional development opportunities featuring the AET" the lowest mean (M = 2.35; SD = 1.11). In addition to receiving the highest mean overall (n = 147; M = 3.22; SD = 1.26), the statement "Lack of technical support at the school level" was also found to have the highest mean for the late majority (n = 45; M = 3.46; SD = 1.17) and the laggards (n = 20; M = 3.90; SD = 1.12). Similarly, the statement "Lack of teacher in-service, training or professional development opportunities featuring the AET" had the lowest mean among the late majority (M = 2.62; SD = 1.24), the laggards (M = 2.45; SD = 0.89), and overall (M = 2.50; SD = 1.18; see Table 25).

Table 25

Participants' Perceptions of Selected Barriers to Diffusion of the AET by Adopter Category: Technical Expertise

	Innovators (n = 4)		Early Adopters (n = 29)		Early Majority (n = 49)		Late Majority (n = 45)		Laggards (n = 20)		Total (n = 147)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Lack of technical support from the AET	1.25	0.50	2.28	0.96	2.50	1.14	2.76	1.19	2.80	1.44	2.54	1.18
Lack of technical support at the school level	3.50	1.00	2.90	1.32	2.89	1.25	3.46	1.17	3.90	1.12	3.22	1.26
Lack of knowledge about the AET	2.50	1.29	3.03	1.32	3.04	1.10	3.38	1.19	3.50	1.28	3.19	1.21
Lack of teacher in-service, training or professional development opportunities featuring the AET	2.75	1.71	2.55	1.33	2.35	1.11	2.62	1.24	2.45	0.89	2.50	1.18

Note. Scale items: 1 = *No barrier*; 2 = *Weak barrier*; 3 = *Moderate barrier*; 4 = *Strong barrier*; and 5 = *Very strong barrier*.

Finally, the means and standard deviations found for each statement within the "lack of resources" construct regarding perceived barriers to adoption and use of the AET are displayed in Table 26. In the case of all five adopter categories (n = 147), the statement "Lack of adequate teacher access to computers or Internet" was found to have the lowest mean (M = 2.62; SD = 1.31). Specifically, the means for each category were 2.75 (SD = .96) for the innovators (n = 4), 2.07 (SD = 1.31) for the early adopters (n = 29), 2.50 (SD = 1.21) for the early majority (n = 49), 2.78 (SD = 1.25) for the late majority (n = 45), and 3.30 (SD = 1.49) for the laggards (n = 20). In contrast, the statement "Lack of adequate technology-enhanced classrooms or labs" was found to have the highest mean for all 147 participants as a group (M = 3.32; SD = 1.39), as well as the highest mean for the early adopters (M = 2.67; SD = 1.36), the early majority (M = 3.07; SD = 1.26), and the laggards (M = 4.20; SD = 1.11) as subgroups. As for the two remaining adopter categories, the statement "Lack of adequate student access to computers or Internet" received the highest mean for the innovators (M = 4.00; SD = 0.82) and the late majority (M = 3.59; SD = 1.40; see Table 26).

Table 26

Participants' Perceptions of Selected Barriers to Diffusion of the AET by Adopter Category: Lack of Resources

	Innovators (n = 4)		Early Adopters (n = 29)		Early Majority (n = 49)		Late Majority (n = 45)		Laggards (n = 20)		Total (n = 147)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Lack of adequate technology-enhanced classrooms or labs	3.75	0.96	2.67	1.36	3.07	1.26	3.58	1.45	4.20	1.11	3.32	1.39
Lack of adequate teacher access to computers or Internet	2.75	0.96	2.07	1.31	2.50	1.21	2.78	1.25	3.30	1.49	2.62	1.31
Lack of adequate student access to computers or Internet	4.00	0.82	2.33	1.23	2.91	1.29	3.59	1.40	4.10	1.21	3.20	1.41

Note. Scale items: 1 = *No barrier*; 2 = *Weak barrier*; 3 = *Moderate barrier*; 4 = *Strong barrier*; and 5 = *Very strong barrier*.

The means and standard deviations found for each of the six barrier constructs regarding perceived barriers to adoption and use of the AET are displayed and organized by adopter category in Table 27. In addition to receiving the highest mean overall (n = 147; M = 3.50; SD = 0.90), the "concerns about time" construct also received the highest mean for the innovators (n = 4; M = 3.67; SD = 0.72), the early adopters (n = 29; M = 3.46; SD = 0.92), the early majority (n = 49; M = 3.32; SD = 0.88), and the late majority (n = 45; M = 3.59; SD = 0.85). Conversely, the "fear of technology" construct was found to have the lowest barrier construct mean for the innovators (M = 1.83; SD = 0.69), the early majority (M = 2.37; SD = 0.96), the late majority (M = 2.87; SD = 1.09), and the laggards (n = 20; M = 2.56; SD = 1.19), and also had the lowest construct mean overall (M = 2.56; SD = 1.06). However, the "lack of resources" construct was found to have the lowest construct mean for the early adopters (M = 2.36; SD = 1.20), and the highest construct mean for the laggards (M = 3.87; SD = 1.12; see Table 27).

Table 27

Participants' Perceptions of Selected Barriers to Diffusion of the AET by Adopter Category

	Innovators (n = 4)		Early Adopters (n = 29)		Early Majority (n = 49)		Late Majority (n = 45)		Laggards (n = 20)		Total (n = 147)	
Statement	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Concerns about time	3.67	0.72	3.46	0.92	3.32	0.88	3.59	0.85	3.78	1.04	3.50	0.90
Credibility of the AET	2.50	0.89	2.90	1.03	2.65	0.99	3.33	0.98	3.01	1.33	2.95	1.07
Lack of support	2.58	0.50	2.87	0.95	2.71	1.06	3.04	0.84	3.15	0.95	2.90	0.95
Fear of technology	1.83	0.69	2.48	1.03	2.37	0.96	2.87	1.09	2.56	1.19	2.56	1.06
Technical expertise	2.50	0.46	2.69	0.92	2.70	0.92	3.05	0.99	3.16	0.81	2.86	0.93
Lack of resources	3.50	0.79	2.36	1.20	2.83	1.15	3.31	1.22	3.87	1.12	3.04	1.25

Note. This analysis was based on mean scores of the constructs. Scale items: 1 = *No barrier*; 2 = *Weak barrier*; 3 = *Moderate barrier*; 4 = *Strong barrier*; and 5 = *Very strong barrier*.

Findings Pertaining to Research Question Six

Research question six sought to examine the relationships between selected characteristics of participating SBAE programs (n = 136) in Oklahoma and their derived innovativeness scores regarding adoption and use of the AET. The selected SBAE program characteristics included in the analysis consisted of the number of teachers in the program, the population of the city or town in which the program was located, the number of students enrolled in the SBAE program, and the number of FFA members within the program. Although very strong, statistically significant correlations ($p < .01$) were found between the number of teachers in the program and SBAE program enrollment (r = .86), the number of teachers in the program and FFA membership (r = .84), and SBAE program enrollment and FFA membership (r = .97), no statistically significant correlations were found between any of the selected SBAE program characteristics and program innovativeness score (see Table 28).

Table 28

Relationships[a] Between Selected Characteristics of Participating SBAE Programs and Their Derived Innovativeness Scores (n = 136)

	1	*2*	*3*	*4*	*5*
1. Innovativeness score	---	.09	.08	.12	.08
2. Teachers in SBAE program		---	.17	.86**	.84**
3. Population of SBAE program city or town			---	.13	.14
4. SBAE program enrollment				---	.97**
5. FFA membership					---

Note. [a]Pearson correlation coefficient. **$p < .01$. Correlation magnitudes: negligible (r = .01 to .09); low (r = .10 to .29); moderate (r = .30 to .49); substantial (r = .50 to .69); and very strong (r = .70 or higher; Davis, 1971).

Findings Pertaining to Research Question Seven

Research question seven was intended to study the relationships between selected personal and professional characteristics of participants and the innovativeness scores of their respective SBAE programs. The personal and professional characteristics included in the analysis were age, years of experience teaching SBAE, and the population of the city or town in which the participant lived. In addition to the very strong, significant correlation ($p < .01$) found between age and years of experience teaching SBAE ($r = .78$), low, yet statistically significant, correlations ($p < .05$) were revealed between age and program innovativeness score ($r = .21$), and years of experience teaching SBAE and program innovativeness score ($r = .21$; see Table 29).

Table 29

Relationships[a] Between Selected Personal and Professional Characteristics of Participants and Their SBAE Programs' Derived Innovativeness Scores (n = 146)

	1	*2*	*3*	*4*
1. Innovativeness score	---	.21*	.21*	.15
2. Age		---	.78**	–.10
3. Years teaching SBAE			---	.04
4. Population of city or town of residence				---

Note. [a]Pearson correlation coefficient. *$p < .05$. **$p < .01$. Correlation magnitudes: negligible ($r = .01$ to .09); low ($r = .10$ to .29); moderate ($r = .30$ to .49); substantial ($r = .50$ to .69); and very strong ($r = .70$ or higher; Davis, 1971).

Findings Pertaining to Research Question Eight

Research question eight sought to examine the relationships between selected SBAE program characteristics and participants' perceptions of the AET based on Rogers' (2003) five attributes of innovations: relative advantage, compatibility, complexity, trialability, and observability. Similar to research question six, the selected program characteristics included in

this analysis consisted of the number of teachers in the program, the population of the city or town in which the program was located, the number of students enrolled in the SBAE program, and the number of FFA members within the program. However, no statistically significant correlations were found between the selected program characteristics and participants' perceptions of the AET based on Rogers' (2003) five attributes of innovations (see Table 30).

Table 30

Relationships[a] Between Selected Characteristics of Participating SBAE Programs and Participants' Views of the AET Based on Rogers' (2003) Attributes of Innovations (n = 136)

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Teachers in SBAE program	---	.43**	.76**	.76**	.05	.05	–.04	.07	.10
2. Population of SBAE program city or town		---	.43**	.42**	–.03	–.05	–.06	–.08	.07
3. SBAE program enrollment			---	1.00**	–.01	–.03	–.12	.01	.10
4. FFA membership				---	–.03	–.04	–.14	.00	.10
5. Relative advantage[b]					---	.74**	.69**	.37**	.50**
6. Compatibility[b]						---	.68**	.53**	.58**
7. Complexity[b]							---	.52**	.57**
8. Trialability[b]								---	.60**
9. Observability[b]									---

Note. This analysis was based on mean scores of the constructs. [a]Spearman correlation coefficient. [b]Scale items: 1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Neutral*; 4 = *Agree*; and 5 = *Strongly agree*. **$p < .01$. Correlation magnitudes: negligible (r_s = .01 to .09); low (r_s = .10 to .29); moderate (r_s = .30 to .49); substantial (r_s = .50 to .69); and very strong (r_s = .70 or higher; Davis, 1971).

Findings Pertaining to Research Question Nine

The aim of research question nine was to describe the relationships between selected personal and professional characteristics of participants and their perceptions of the AET per Rogers' (2003) attributes. The characteristics of interest included age, years of experience teaching SBAE, and the population of the city or town in which the participant lived. As displayed in Table 31, low, yet significant, negative correlations were found between years teaching SBAE and perceptions of the AET based on relative advantage ($r_s = –.26$; $p < .01$), years teaching SBAE and perceptions of the AET related to compatibility ($r_s = –.21$; $p < .01$), and years of teaching SBAE and perceptions of the AET regarding its complexity ($r_s = –.18$; $p < .05$).

Table 31

Relationships[a] Between Selected Personal and Professional Characteristics of Participants and Their Views of the AET Based on Rogers' (2003) Attributes of Innovations (n = 146)

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1. Age	---	.81**	–.06	–.08	–.07	–.05	.02	.05
2. Years teaching SBAE		---	–.04	–.26**	–.21**	–.18*	–.06	–.00
3. Population of city or town of residence			---	.00	.03	–.00	–.05	.05
4. Relative advantage[b]				---	.75**	.68**	.38**	.50**
5. Compatibility[b]					---	.67**	.53**	.58**
6. Complexity[b]						---	.52**	.57**
7. Trialability[b]							---	.60**
8. Observability[b]								---

Note. This analysis was based on mean scores of the constructs. [a]Spearman correlation coefficient. [b]Scale items: 1 = *Strongly disagree*; 2 = *Disagree*; 3 = *Neutral*; 4 = *Agree*; and 5 = *Strongly agree*. *$p < .05$. **$p < .01$. Correlation magnitudes: negligible ($r_s = .01$ to .09); low ($r_s = .10$ to .29); moderate ($r_s = .30$ to .49); substantial ($r_s = .50$ to .69); and very strong ($r_s = .70$ or higher; Davis, 1971).

Findings Pertaining to Research Question Ten

Research question ten sought to examine the relationships between selected SBAE program characteristics and participants' views on selected barriers to diffusion of the AET. The selected barrier constructs included in the analysis consisted of "concerns about time," "credibility of the AET," "lack of support," "fear of technology," "technical expertise," and "lack of resources." The SBAE program characteristics of interest included the number of teachers in the program, the population of the city or town in which the program was located, the number of students enrolled in the SBAE program, and the number of FFA members in the program. Low, yet statistically significant, correlations were found between participants' perceptions of selected barriers related to "concerns about time" and the number of teachers in a SBAE program (r_s = .22; $p < .05$), the population of the city or town of the SBAE program (r_s = .20; $p < .05$), the number of students enrolled in the SBAE program (r_s = .21; $p < .05$), and the number of FFA members in the program (r_s = .22; $p < .01$). An additional low, but statistically significant relationship was found between the population of the city or town in which the SBAE program was located and participants' perceptions of selected barriers related to "fear of technology" (r_s = .17; $p < .05$). These correlations are presented in Table 32.

Table 32

Relationships[a] Between Selected SBAE Program Characteristics and Participants' Views on Selected Barriers to Diffusion of the AET (n = 136)

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1. Teachers in SBAE program	---	.43**	.76**	.76**	.22*	–.02	–.04	.16	.04	–.05
2. Population of SBAE program city or town		---	.43**	.42**	.20*	.14	.11	.17*	.02	–.14
3. SBAE program enrollment			---	1.00**	.21*	.04	–.01	.15	.12	.01
4. FFA membership				---	.22**	.05	–.01	.13	.13	.00
5. Concerns about time[b]					---	.50**	.54**	.30**	.45**	.36**
6. Credibility of the AET[b]						---	.71**	.39**	.60**	.39**
7. Lack of support[b]							---	.46**	.63**	.34**
8. Fear of technology[b]								---	.37**	.31**
9. Technical expertise[b]									---	.53**
10. Lack of resources[b]										---

Note. This analysis was based on mean scores of the constructs. [a]Spearman correlation coefficient. [b]Scale items: 1 = *No barrier*; 2 = *Weak barrier*; 3 = *Moderate barrier*; 4 = *Strong barrier*; and 5 = *Very strong barrier*. *$p < .05$. **$p < .01$. Correlation magnitudes: negligible (r_s = .01 to .09); low (r_s = .10 to .29); moderate (r_s = .30 to .49); substantial (r_s = .50 to .69); and very strong (r_s = .70 or higher; Davis, 1971).

Findings Pertaining to Research Question Eleven

Research question eleven was intended to describe the relationships between selected personal and professional characteristics of participants and their views on selected barriers to diffusion of the AET. In addition to the six barrier constructs, the personal and professional characteristics included in this analysis were age, years of experience teaching SBAE, and the population of the city or town in which the participant lived. As presented in Table 33, a low, yet statistically significant, relationship ($p < .05$) was found between the number of years a participant spent teaching SBAE and their perceptions of "credibility of the AET" ($r_s = .17$) as a barrier to its use.

Table 33

Relationships[a] Between Selected Personal and Professional Characteristics of Participants and Their Views on Selected Barriers to Diffusion of the AET (n = 146)

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Age	---	.78**	–.10	–.07	.01	–.08	–.03	–.13	–.12
2. Years teaching SBAE		---	.04	.08	.17*	.11	.05	–.02	–.12
3. Population of city or town of residence			---	.09	.05	.03	–.10	.04	–.21*
4. Concerns about time[b]				---	.56**	.59**	.37**	.50**	.39**
5. Credibility of the AET[b]					---	.73**	.44**	.60**	.42**
6. Lack of support[b]						---	.51**	.63**	.37**
7. Fear of technology[b]							---	.38**	.35**
8. Technical expertise[b]								---	.52**
9. Lack of resources[b]									---

Note. This analysis was based on mean scores of the constructs. [a]Pearson correlation coefficient. [b]Scale items: 1 = *No barrier*; 2 = *Weak barrier*; 3 = *Moderate barrier*; 4 = *Strong barrier*; and 5 = *Very strong barrier*. *$p < .05$. **$p < .01$. Correlation magnitudes: negligible ($r_s = .01$ to .09); low ($r_s = .10$ to .29); moderate ($r_s = .30$ to .49); substantial ($r_s = .50$ to .69); and very strong ($r_s = .70$ or higher; Davis, 1971).

Findings Pertaining to Research Question Twelve

Research question twelve sought to determine whether SBAE program innovativeness regarding adoption and use of the AET can be predicted by SBAE teachers' selected personal and professional characteristics and views on attributes impacting diffusion of the AET. The covariates included in the initial model of the hierarchical regression were derived from Rogers' (2003) theoretical generalizations about earlier and later adopters. Specifically, the researcher regressed SBAE program innovativeness regarding adoption and use of the AET against highest degree earned, SBAE program enrollment, and cosmopoliteness. This covariate regression model was found to be significant, $F(3, 141) = 3.56$, $p < .05$, as SBAE teachers' highest degree earned ($\beta = .17$, $p < .05$) accounted for approximately 7% ($R^2 = .07$) of the variance in SBAE program innovativeness regarding adoption and use of the AET (see Table 34).

For Model 2, the relative advantage, compatibility, complexity, trialability, and observability construct scores were added to the previous covariates, because Rogers (2003) contended that perceptions based on these attributes are predictive of the rate at which an innovation is adopted. The inclusion of the five attribute construct scores explained an additional 14% ($\Delta R^2 = .14$) of the variance in SBAE program innovativeness regarding adoption and use of the AET. As a unit, this model was found to be significant, $F(8, 136) = 4.62$, $p < .001$, as SBAE teachers' highest degree earned ($\beta = .18$, $p < .05$) and perceptions of the AET based on compatibility ($\beta = .26$, $p < .05$) accounted for 21% ($R^2 = .21$) of the variance in SBAE program innovativeness regarding adoption and use of the AET (see Table 34).

Finally, age was added as a potential predictor variable in Model 3. The inclusion of age in the model accounted for an additional 5% ($\Delta R^2 = .05$) of the variance in SBAE program innovativeness regarding adoption and use of the AET. Of the three, this model was found to be the most significant, $F(9, 135) = 5.34$, $p < .001$, with SBAE teachers' highest degree earned ($\beta =$

.15, $p < .05$), SBAE program enrollment ($\beta = .16$, $p < .05$), age ($\beta = .23$, $p < .01$), and perceptions of the AET based on compatibility ($\beta = .25$, $p < .05$) accounting for 26% ($R^2 = .26$) of the variance in SBAE program innovativeness regarding adoption and use of the AET (see Table 34).

Table 34

Hierarchical Regression Analysis: Predictors of SBAE Program Innovativeness Regarding Adoption and Use of the AET (n = 145)

	Model 1*	Model 2***	Model 3***
Predictor Variable	β	β	β
Highest degree earned	.17*	.18*	.15*
SBAE program enrollment	.13	.14	.16*
Cosmopoliteness	.13	.10	.12
Relative advantage		–.07	–.04
Compatibility		.26*	.25*
Complexity		.07	.06
Trialability		.04	.05
Observability		.14	.11
Age			.23**
R^2	.07	.21	.26
ΔR^2		.14	.05

Note. *$p < .05$. **$p < .01$. ***$p < .001$.

Chapter Summary

Chapter IV provided a detailed account of the findings derived from each of the research questions guiding this study. Data indicative of the findings were presented in Tables 8 through 34. In addition to summarizing the methodology and findings, Chapter V will also present the resulting conclusions, implications, and recommendations for future research and practice.

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS, IMPLICATIONS, AND DISCUSSION

Although record keeping has been long regarded as an instrumental component of any quality SAE program (Boone, 2010; Camp et al., 2000; Davis & Williams, 1979; Ford et al., 2012; Jenkins & Kitchell, 2009; Moore, 1979; Phipps et al., 2008; Rubenstein & Thoron, 2014), it has also been recognized as an impediment to SAE implementation and participation (Foster, 1986; Wilson & Moore, 2007). The Agricultural Experience Tracker (the AET) is one of several computerized, record keeping systems developed as a potential solution to this problem. Since being released in 2007, the AET has been utilized by nearly 850,000 students in 46 different states (The Agricultural Experience Tracker, 2017a). Following the 2014 approval of House Bill (HB) 3006, a bill requiring every SBAE student in Oklahoma to maintain a SAE, the Agricultural Education Division of CareerTech mandated adoption of the AET by all SBAE programs in Oklahoma (J. Staats, personal communication, December 1, 2015).

Provided the steadily increasing presence of the AET in SBAE (The Agricultural Experience Tracker, 2017a; National FFA Organization, 2013), it may be inferred that the innovation has reached a point of successful diffusion. However, until this phenomenon is examined using formal research methodologies, this deduction is purely speculative. As such, the two-fold purpose of this study was to 1) describe the relationships between the innovativeness of

SBAE programs in Oklahoma and the perceptions of SBAE teachers regarding diffusion of the AET; 2) predict the innovativeness of SBAE programs in Oklahoma from SBAE teachers' selected personal and professional characteristics and perceptions regarding diffusion of the AET.

Twelve research questions guided this study:

1. To what degree did SBAE programs in Oklahoma from each adopter category utilize selected features of the AET in 2015?
2. What were selected characteristics of SBAE programs in Oklahoma from each adopter category?
3. What were selected personal and professional characteristics of study participants (e.g., SBAE teachers in Oklahoma) from each adopter category?
4. What were the study participants' views on selected attributes impacting diffusion of the AET?
5. What were the study participants' views on selected barriers to diffusion of the AET?
6. What relationships existed between selected characteristics of SBAE programs in Oklahoma and their derived innovativeness scores?
7. What relationships existed between selected personal and professional characteristics of study participants and the derived innovativeness scores of their SBAE programs?
8. What relationships existed between selected SBAE program characteristics and study participants' views on attributes impacting diffusion of the AET?
9. What relationships existed between selected personal and professional characteristics of study participants and their views on attributes impacting diffusion of the AET?

10. What relationships existed between selected SBAE program characteristics and study participants' views on barriers to diffusion of the AET?

11. What relationships existed between selected personal and professional characteristics of study participants and their views on barriers to diffusion of the AET?

12. Can SBAE program innovativeness regarding adoption and use of the AET be predicted by study participants' selected personal and professional characteristics and views on attributes impacting diffusion of the AET?

In addition to presenting the background and need for the study, Chapter I also provided a concise overview of the study's purpose, research questions, assumptions, limitations, and key definitions. Chapter II provided a thorough examination of pertinent literature related to SBAE, SAE, record keeping of SAE, computer integration in SBAE, electronic means of SAE record keeping, the AET, and Rogers' (2003) diffusion of innovations theory. Chapter III presented the study's research design, methods, and procedures utilized to conduct this study. Chapter IV offered the findings associated with each research question. Finally, before providing a summary of the resulting conclusions, implications, discussions, and recommendations, Chapter V will present a brief overview of the study's research design, methods, and findings.

Research Design and Methods

This census study was conducted using a cross-sectional, survey design (Creswell, 2014; Johnson & Christensen, 2014). Because the data were only collected from the participants at a single point in time (Gay et al., 2009), a cross-sectional, survey design was selected to describe selected personal and professional characteristics of the participants, their perceptions of the AET based on selected attributes, and their perceptions of selected barriers to diffusion of the AET. Further, descriptive, correlational, and archival research approaches were also employed (Johnson & Christensen, 2014; Privitera, 2017).

After receiving approval for the study from Oklahoma State University's Institutional Review Board (IRB), every SBAE program in the state of Oklahoma was categorized by innovativeness according to Rogers' (2003) proposed adopter categories. *Innovativeness* was operationalized as the degree to which each SBAE program utilized the AET in 2015. The researcher utilized an archival research approach to analyze preexisting data indicative of each Oklahoma SBAE program's use of the AET from January through December of 2015 (Privitera, 2017). A panel of experts was consulted to determine the selected metrics to be used for the purpose of adopter categorization (Rogers, 2003). Once every SBAE program categorized per Rogers' (2003) conventions, data were collected by way of an electronic survey instrument. This method of data collection was selected because of its cost and timeliness (Dillman et al., 2014). The instrumentation for this study consisted of a researcher-modified version of Li's (2004) survey instrument.

The population of interest was comprised of every SBAE program in Oklahoma (N = 357). However, for the purpose of data collection, SBAE teachers were treated as proxies for their respective programs. Due to the population's relatively small size, the study was conducted as a census (Gay et al., 2009). A total of 166 SBAE teachers belonging to 156 different programs returned the survey instrument with valid responses. Of the responding SBAE programs, four were categorized as innovators, 30 as early adopters, 51 as the early majority, 50 as the late majority, and 21 as laggards.

All data were analyzed using Version 21 of IBM Statistical Package for Social Sciences (SPSS©) for Apple© computers. Standardized z scores were calculated for research question one. Research questions two through five were answered through the calculation of means, standard deviations, frequencies, and percentages. Research questions six through eleven were answered by calculating Pearson correlation coefficients (r) and Spearman correlation coefficients (r_s). Finally, standardized beta coefficients (β), significance values (p), the coefficient of

determination (R^2), and the change in R^2 (ΔR^2) were used to report the data pertaining to research question twelve.

Summary of Findings

The findings of this study have been organized by research question and are summarized below. For each research question, the means, standard deviations, percentages, correlation coefficients, and significance values of interest are displayed in the provided summary.

Research Question One

The intent of research question one was to examine the degree to which SBAE programs in Oklahoma from each adopter category utilized selected features of the AET in 2015. In addition to having the greatest percentage of students with profiles on the AET (M = 79.51; SD = 45.48), the SBAE programs categorized as the innovators (n = 9) were also found to have the most student logins per student (M = 12.59; SD = 11.49), student logins per teacher (M = 858.61; SD = 848.47), teacher logins per teacher (M = 123.44; SD = 107.80), journal hours per student (M = 121.66; SD = 144.52), journal entries per student (M = 16.16; SD = 14.50), journal entries per student login (M = 6.17; SD = 12.15), course-related journal entries per student with journal entries (M = 6.69; SD = 7.39), SAE-related journal entries per student with journal entries (M = 21.76; SD = 46.52), non-FFA-related journal entries per student with journal entries (M = 0.45; SD = 0.93), FFA office-related journal entries per student with journal entries (M = 1.62; SD = 3.16), CDE-related journal entries per student with journal entries (M = 1.79; SD = 3.27), and committee-related journal entries per student with journal entries (M = 0.08; SD = 0.22). Conversely, the early adopters (n = 48), were found to have the highest percentages of students with active accounts on the AET (M = 84.20; SD = 20.88), students with unique logins (M = 111.46; SD = 38.66), students with journal entries (M = 85.77; SD = 33.41), and students with SAE records on the AET (M = 47.11; SD = 25.00). Further, the SBAE programs within this

category also had the most FFA-related (M = 3.27; SD = 2.80) and school and community-related (M = 1.29; SD = 1.33) journal entries per student with journal entries.

The SBAE programs comprising the early majority (n = 122) were not found to utilize any particular feature of the AET to the highest degree. However, these programs were found to have greater percentages of students with active accounts on the AET (M = 78.36; SD = 19.04) and students with SAE records on the AET (M = 31.88; SD = 25.05) than those programs categorized as the innovators. Similarly, the SBAE programs within the late majority (n = 122) also had a higher percentage of students with active accounts on the AET (M = 72.02; SD = 19.53) than the innovators. The SBAE programs categorized as the laggards (n = 56), however, were found to utilize each selected feature of the AET to a lesser degree than the other four adopter categories.

Research Question Two

The intent of research question two was to describe the selected characteristics of participating SBAE programs by their derived adopter categories. The SBAE programs belonging to the late majority (n = 42) were found to have the greatest number of teachers (M = 1.38; SD = 0.54), whereas those programs categorized as the laggards (n = 17) were found to have the fewest teachers (M = 1.12; SD = 0.33). Concerning SBAE program city or town population, the programs making up the early adopters (n = 27) were found to be located in the largest cities and/or towns (M = 20628.78; SD = 85980.55), and the laggard programs were found to be located in the smallest cities and/or towns (M = 983.47; SD = 671.84). The participating SBAE programs categorized as the innovators (n = 4) were found to have the greatest number of students enrolled in SBAE (M = 91.50; SD = 25.80), while those categorized as the laggards were found to have the fewest students enrolled in SBAE (M = 67.76; SD = 22.76). The SBAE programs comprising the

late majority had the most FFA members (M = 89.92; SD = 41.93), and those making up the laggards had the fewest FFA members (M = 67.76; SD = 22.76).

Concerning the Oklahoma FFA Districts represented in each adopter category, two of the innovators (n = 4) were from the Northeast District (50.00%), one was from the Southwest District (25.00%), and one was from the Central District (25.00%). In the case of the early adopters (n = 27), six of the responding programs were from the Northwest District (22.22%), six were from the Southwest District (22.22%), three were from the Central District (11.11%), eight were from the Northeast District (29.63%), and four were from the Southeast District (14.81%). Of those responding SBAE programs comprising the early majority (n = 46), nine were from the Northwest District (19.57%), four were from the Southwest District (8.70%), 11 were from the Central District (23.91%), 12 were from the Northeast District (26.09%), and 10 were from the Southeast District (21.74%). As for the SBAE programs within the late majority (n = 42), five were from the Northwest District (11.90%), two were from the Southwest District (4.76%), 14 were from the the Central District (33.33%), 14 were from the Northeast District (33.33%), and seven were from the Southeast District (16.67%). Of the SBAE programs categorized as the laggards (n = 17), three were from the Northwest District (17.65%), three were from the Southwest District (17.65%), one was from the the Central District (5.88%), three were from the Northeast District (17.65%), and seven were from the Southeast District (41.18%). In total (n = 136), 23 of the participating SBAE programs were from the Northwest District (16.91%), 16 were from the Southwest District (11.76%), 30 were from the the Central District (22.06%), 39 were from the Northeast District (28.68%), and 28 were from the Southeast District (20.59%).

Lastly, concerning each SBAE programs' estimated percentages of student participation for each of the six SAE program types, regardless of adopter category, entrepreneurship was found to be the most prevalent SAE program type (M = 43.97; SD = 23.17). In contrast, service learning was the least prevalent SAE program type (M = 2.20; SD = 4.89).

Research Question Three

Research question three sought to describe the selected personal and professional characteristics of participating teachers belonging to SBAE programs within each adopter category. Concerning the sex of the participants, the majority of the SBAE teachers in all five categories were male (n = 146; F = 114; 78.10%). Similarly, regarding the race/ethnicity of the participants, the majority were White (F = 115; 78.77%). However, seven of the early adopters (n = 29; 24.14%), five of the early majority (n = 48; 10.42%), 13 of the late majority (n = 47; 27.70%), and four of the laggards (n = 18; 22.20%) were American Indian or Native American. Further, one of the early adopters (3.45%) and one of the early majority (2.08%) identified as other.

Regarding the participants' teacher certification paths, the majority of the SBAE teachers comprising all five categories were traditionally certified (F = 129; 88.36%), while the rest were alternatively certified (F = 17; 11.64%). Similarly, the majority of all 146 participants identified a Bachelor's degree as their highest degree earned (F = 110; 75.34%). However, 10 of the early adopters (34.48%), 13 of the early majority (27.08%), eight of the late majority (17.00%), and three of the laggards (16.70%) earned a Master's degree.

In terms of the participating SBAE teachers' perceived computer skill level, two of the innovators (n = 4; 50.00%) rated themselves as *excellent*, while the other two (50.00%) rated themselves as *good*. As for the remaining categories, the majority of the SBAE teachers comprising the early adopters (44.83%), the early majority (54.17%), the late majority (51.06%), and the laggards (55.56%) rated their computer skill level as *good*. Only one participant in the late majority (2.13%) described their computer skill level as being *poor*.

On average, the SBAE teachers belonging to programs categorized as the innovators were found to be the oldest of the participants (M = 48.50; SD = 11.27), while the laggards were

found to be the youngest (M = 32.83; SD = 8.87). Similarly, the innovators were found to have the most years of experience teaching SBAE (M = 17.75; SD = 15.84), and the laggards were found to have the fewest years of experience teaching SBAE (M = 7.44; SD = 6.55). In continuation of this trend, the innovators were found to have spent the most years teaching at their current schools (M = 17.00; SD = 15.38), and the laggards were found to have spent the fewest years teaching at their current schools (M = 3.00; SD = 1.71). Finally, the early adopters were found to reside in the largest cities and/or towns (M = 14818.69; SD = 30091.36), while the laggards were found to reside in the smallest cities and/or towns (M = 1293.56; SD = 992.70).

Research Question Four

Research question four sought to describe participating SBAE teachers' perceptions of the AET based on Rogers' (2003) five attributes of innovations. With the exception of the innovators (n = 4; M = 2.81; SD = 1.52), all 152 participants within the other four categories perceived the AET as a complex innovation (M = 2.15; SD = 0.94). As for the four remaining attributes, on average, all 156 participants were found to hold neutral perceptions of the AET on the basis of relative advantage (M = 3.43; SD = 1.01), compatibility (M = 3.21; SD = 0.94), trialability (M = 3.35; SD = 0.91), and observability (M = 3.49; SD = 0.74). However, the innovators (M = 4.06; SD = 0.94), the early adopters (n = 30; M = 3.59; SD = 1.07), and the early majority (n = 51; M = 3.70; SD = 0.93) individually agreed that the AET was a relatively advantageous innovation. Moreover, the innovators (M = 3.80; SD = 1.10) and the early adopters (M = 3.51; SD = 0.76) agreed that the AET was compatible. In addition, the innovators (M = 4.13; SD = 0.66) and the early majority (M = 3.52; SD = 0.90) agreed that they experienced ample opportunity for trialability of the AET. Lastly, the innovators (M = 4.00; SD = 0.71), the early adopters (M = 3.64; SD = 0.66), and the early majority (M = 3.59; SD = 0.66) also agreed that the AET was sufficiently observable.

Research Question Five

Research question five was intended to describe participating SBAE teachers' perceptions of selected barriers to diffusion of the AET. In the main, "concerns about time" was identified as a strong barrier to diffusion of the AET (n = 147; M = 3.50; SD = 0.90), whereas "credibility of the AET" (M = 2.95; SD = 1.07), "lack of support" (M = 2.90; SD = 0.95), "fear of technology" (M = 2.56; SD = 1.06), "technical expertise" (M = 2.86; SD = 0.93), and "lack of resources" (M = 3.04; SD = 1.25) were identified as moderate barriers to diffusion of the AET. Individually, however, the early adopters (n = 29; M = 3.46; SD = 0.92) and the early majority (n = 49; M = 3.32; SD = 0.88) considered "concerns about time" to be a moderate barrier. Further, "fear of technology" was identified as a weak barrier by the innovators (n = 4; M = 1.83; SD = 0.69), the early adopters (M = 2.48; SD = 1.03), and the early majority (M = 2.37; SD = 0.96). Lastly, "lack of resources" was found to be a strong barrier among the innovators (M = 3.50; SD = 0.79) and the laggards (n = 20; M = 3.87; SD = 1.12), but a weak barrier among the early adopters (M = 2.36; SD = 1.20).

Research Question Six

The intent of research question six was to describe the relationships between selected characteristics of participating SBAE programs in Oklahoma (n = 136) and the innovativeness scores derived from their utilization of selected features of the AET in 2015. However, no statistically significant relationships were found between any of the selected characteristics and program innovativeness scores.

Research Question Seven

Research question seven sought to describe the relationships between the participating SBAE teachers' selected personal and professional characteristics and the innovativeness scores of their respective programs. Low, yet statistically significant relationships ($p < .05$) were found

between the participants' age and program innovativeness score (r = .21), as well as the participants' years of experience teaching SBAE and program innovativeness score (r = .21).

Research Question Eight

Research question eight was intended to describe the relationships between selected SBAE program characteristics and participants' perceptions of the AET based on Rogers' (2003) five attributes of innovations. No statistically significant relationships were found between the selected SBAE program characteristics and the participants' perceptions of the AET according to Rogers' (2003) attributes.

Research Question Nine

Research question nine sought to examine the relationships between the participating SBAE teachers' selected personal and professional characteristics and their perceptions of the AET on the basis of Rogers' (2003) five attributes of innovations. Low, yet statistically significant, relationships were observed between the number of years participants spent teaching SBAE and their perceptions of the AET based on relative advantage (r_s = –.26; p < .01), compatibility (r_s = –.21; p < .01), and complexity (r_s = –.18; p < .05).

Research Question Ten

The intent of research question ten was to describe the relationships between selected SBAE program characteristics and participating teachers' perceptions of selected barriers to adoption and use of the AET. Low, yet statistically significant, relationships were found between participants' perceptions of "concerns about time" as barrier to diffusion of the AET and the number of teachers in a SBAE program (r_s = .22; p < .05), the population of the city or town of the SBAE program (r_s = .20; p < .05), the number of students enrolled in the SBAE program (r_s = .21; p < .05), and the number of FFA members in the program (r_s = .22; p < .01). Further, a low,

but statistically significant, relationship was found between the population of the city or town in which the SBAE program was located and participants' perceptions of "fear of technology" as a barrier to diffusion of the AET ($r_s = .17$; $p < .05$).

Research Question Eleven

Research question eleven sought to examine the relationships between the participating SBAE teachers' selected personal and professional characteristics and their perceptions of selected barriers to adoption and use of the AET. A low, yet statistically significant, relationship ($p < .05$) was found between the number of years participants spent teaching SBAE and their perceptions of "credibility of the AET" ($r_s = .17$) as a barrier to its diffusion.

Research Question Twelve

Research question twelve was intended to determine whether SBAE program innovativeness regarding adoption and use of the AET could be predicted by SBAE teachers' selected personal and professional characteristics and views on selected attributes impacting diffusion of the AET. To accomplish this, the researcher employed a hierarchical, block regression analysis. In Model 1, SBAE program innovativeness regarding adoption and use of the AET was regressed against three SBAE teacher characteristics related to Rogers' (2003) generalizations about earlier and later adopters: highest degree earned, SBAE program enrollment, and cosmopoliteness. This regression model was found to be significant, $F(3, 141) = 3.56$, $p < .05$, as SBAE teachers' highest degree earned ($\beta = .17$, $p < .05$) explained 7% ($R^2 = .07$) of the variance in SBAE program innovativeness regarding adoption and use of the AET.

In Model 2, adding the relative advantage, compatibility, complexity, trialability, and observability construct scores as independent variables accounted for an additional 14% ($\Delta R^2 = .14$) of the variance in SBAE program innovativeness regarding adoption and use of the AET. This model was also significant, $F(8, 136) = 4.62$, $p < .001$, as SBAE teachers' highest degree

earned and (β = .18, p < .05) perceptions of the AET based on compatibility (β = .26, p < .05) explained 21% (R^2 = .21) of the variance in SBAE program innovativeness regarding adoption and use of the AET.

Finally, in Model 3, age was included as a potential predictor variable and explained an additional 5% (ΔR^2 = .05) of the variance in SBAE program innovativeness regarding adoption and use of the AET. This model was the most significant of the three, $F(9, 135) = 5.34$, p < .001, with highest degree earned (β = .15, p < .05), SBAE program enrollment (β = .16, p < .05), age (β = .23, p < .01), and perceptions of the AET based on compatibility (β = .25, p < .05) explaining 26% (R^2 = .26) of the variance in SBAE program innovativeness regarding adoption and use of the AET.

Conclusions

In response to the findings of this study, and in recognition of its limitations, 15 conclusions were made:

1. In 2015, just over one-fourth of all students enrolled in SBAE programs in Oklahoma had SAE records on the AET.

2. Of all five adopter categories, the SBAE programs in Oklahoma categorized as innovators utilized the AET to the greatest extent, but had one of the lowest percentages of individual student users.

3. In addition to working in larger SBAE programs and FFA chapters, the SBAE teachers in Oklahoma comprising the earlier adopters were also more educated and cosmopolite than those of the later adopters.

4. SBAE teachers in Oklahoma considered the AET to be a complex innovation.

5. SBAE teachers in Oklahoma perceived “concerns about time” as a strong barrier to adoption and use of the AET.

6. The SBAE teachers in Oklahoma categorized as laggards did not perceive themselves as being knowledgeable about the AET.

7. Regarding adoption and use of the AET, the SBAE programs in Oklahoma with older and/or more experienced teachers were more innovative than those with younger and/or less experienced teachers.

8. SBAE teachers in Oklahoma with more years of experience considered the AET to be less relatively advantageous and compatible than those with fewer years of teaching experience.

9. SBAE teachers in Oklahoma with more years of experience considered the AET to be less complex than those with fewer years of teaching experience.

10. SBAE teachers in Oklahoma who taught in larger SBAE programs and/or communities perceived “concerns about time” as a stronger barrier to adoption and use of the AET than those who taught in smaller SBAE programs and/or communities.

11. SBAE teachers in Oklahoma who taught in larger communities perceived “fear of technology” as a stronger barrier to adoption and use of the AET than those who taught in smaller communities.

12. SBAE teachers in Oklahoma with more years of experience perceived “credibility of the AET” as a stronger barrier to adoption and use of the AET than those with fewer years of teaching experience.

13. Although highly predictive as a model, only one of the SBAE teacher characteristics derived from Rogers' (2003) theoretical generalizations was consistently predictive of SBAE program innovativeness in Oklahoma.

14. After controlling for years of formal education, SBAE program enrollment, and cosmopoliteness, SBAE teachers' perceptions of the AET per Rogers' (2003) attributes of innovations were found to improve the extent to which SBAE program innovativeness in Oklahoma could be predicted.

15. Regarding adoption and use of the AET, SBAE teacher age was found to be the most significant predictor of SBAE program innovativeness in Oklahoma.

Each of the aforementioned conclusions will be further discussed in the subsequent section.

Discussion and Implications

The conclusions of this study were theoretically grounded in Rogers' (2003) diffusion of innovations theory. To reiterate, for the purpose of this study, innovativeness was operationalized as the degree to which SBAE programs in Oklahoma utilized selected features of the AET in 2015.

Conclusion 1: In 2015, just over one-fourth of all students enrolled in SBAE programs in Oklahoma had SAE records on the AET.

As presented in Chapter IV, the data indicative of every Oklahoma SBAE programs' utilization of the AET in 2015 revealed that only 25.51% all students enrolled in SBAE had SAE records on the AET. In the summer of 2014, the Agricultural Education Division of CareerTech mandated the immediate adoption and use of the AET by all SBAE programs in Oklahoma (R. Bonjour, personal communication, April 13, 2017). However, in December of the same year, an executive decision was made to allow all students with preexisting SAE records to choose

between use of an Excel record book or the AET for the duration of their SBAE careers (R. Bonjour, personal communication, April 13, 2017). As such, the students without SAE records on the AET in 2015 were likely maintaining records in an Excel template, neglecting the practice of record keeping altogether, or lacking SAE programs.

So what are the resulting implications of this conclusion? The Agricultural Education Division of CareerTech has been purchasing annual subscriptions from the AET for every SBAE program in Oklahoma since the start of the 2014-2015 school year (R. Bonjour, personal communication, April 13, 2017). Regardless of whether a student with preexisting SAE records chose to transition to the AET or to continue using an Excel template, a subscription for the AET was purchased on that student's behalf. Therefore, if only 25.51% of all SBAE students in Oklahoma kept SAE records on the AET in 2015, what can be said for the return on investment of the subscriptions purchased for the other 74.49% of students? Further, SAE programs provide students the opportunity to apply classroom concepts in more individualized and authentic settings (Dyer & Osborne, 1995; Dyer & Williams, 1997; Hughes & Barrick, 1993; Phipps et al., 2008; Talbert et al., 2007). Combined with FFA participation, SAE programs enable SBAE teachers to provide individualized instruction to students with a variety of backgrounds, abilities, interests, and ambitions (Hughes & Barrick, 1993). By individualizing instruction in this manner, teachers are better able to meet the particular needs of each student, regardless of whether they choose to pursue a postsecondary education, or are of limited opportunity (Hughes & Barrick, 1993). If students are not utilizing the AET because they are lacking SAE programs, then they will not be receiving the quality, student-centered education on which this profession prides itself. Moreover, the literature has recognized the importance of maintaining accurate and up-to-date SAE records (Camp et al., 2000; Ford et al., 2012; Jenkins & Kitchell, 2009; Rubenstein & Thoron, 2014). Therefore, if students are not keeping satisfactory records, the quality of their SAE programs will likely reflect that (Camp et al., 2000; Jenkins & Kitchell, 2009).

Conclusion 2: Of all five adopter categories, the SBAE programs in Oklahoma categorized as innovators utilized the AET to the greatest extent, but had one of the lowest percentages of individual student users.

In addition to having the largest percentage of students with profiles on the AET, the SBAE programs categorized as the innovators also had the most student logins, teacher logins, and journal hours and entries per student. However, less than 70% of the students in this category had active accounts on the AET, and only 31% had SAE records on the AET. This finding suggests that, although the innovators appear to have been the most attentive in adopting this innovation, they were doing so with relatively few students.

Provided the low fairly percentage of student users, how did the SBAE programs categorized as the innovators utilize the AET to such a great extent in 2015? Perhaps this feat can be attributed to a greater placement of emphasis on student recognition and FFA award programs. Quality SAE records play an essential role in several FFA degree and award applications (Talbert et al., 2007). According to Phipps et al. (2008), in evaluating students' SAE records, SBAE teachers should "identify appropriate FFA proficiency awards and degrees for which the student should apply, and encourage the student to complete the appropriate application forms" (p. 474). But what about those students who may not be as interested in or motivated by FFA degrees and awards? The relatively low percentages of students with active accounts and SAE records on the AET indicate that a large number of students belonging to this category were not experiencing this innovation. Does this mean that the majority of students in these programs were still keeping records using Excel templates? Were the majority of students in these programs keeping records at all? Did the majority of students in these programs have SAE programs?

Conclusion 3: In addition to working in larger SBAE programs and FFA chapters, the SBAE teachers in Oklahoma comprising the earlier adopters were also more educated and cosmopolite than those of the later adopters.

This conclusion was derived from findings associated with research questions two and three and is consistent with several of Rogers' (2003) contentions regarding the characteristics of adopter categories. As cited in the theoretical framework of this study, Rogers (2003) further categorized the innovators, early adopters, and early majority as the *earlier adopters*, and the late majority and laggards as the *later adopters*. According to Rogers (2003), "earlier adopters have larger-sized units (farms, schools, companies, and so on) than do later adopters" (p. 288). The findings of this study supported this assertion, as the Oklahoma SBAE programs and FFA chapters belonging to the earlier adopters grouping were found to be larger than those of the later adopters. Similarly, in alignment with Rogers' (2003) contention, "earlier adopters have more years of formal education than do later adopters" (p. 288), 30.86% of the earlier adopters were reported to have earned a degree above their Bachelor's, and only 16.92% of later adopters were reported to have done the same. Finally, Rogers (2003) purported that "earlier adopters are more cosmopolite than are later adopters" (p. 290). To reiterate, cosmopoliteness can be described as the extent to which individuals are oriented, or willing to venture, outside of their local systems (Rogers, 2003). On average, the SBAE teachers making up the earlier adopters both resided and worked in larger cities or towns than did those making up the later adopters. Moreover, in terms of population, the cities or towns in which the earlier adopters worked were nearly three times the size of those in which the later adopters worked, which is consistent with Rogers' (2003) aforementioned generalization regarding cosmopoliteness.

Conclusion 4: SBAE teachers in Oklahoma considered the AET to be a complex innovation.

Complexity is described as the extent to which an individual perceives an innovation as being hard to use and comprehend, and has been recognized as one of Rogers' (2003) five attributes of innovations. According to Rogers (2003), the rate at which an innovation will be adopted is not impacted by the attributes themselves, but rather, by how the innovation is perceived on the basis of these attributes. Complexity is negatively correlated to rate of adoption (Rogers, 2003). Therefore, if individuals perceive an innovation as being complex, the rate at which the innovation is adopted will be slowed. Conversely, if individuals do not perceive an innovation as being complex, the rate at which the innovation is adopted will be hastened.

This study found that SBAE teachers in Oklahoma perceive the AET as a complex innovation. While the mandated use of the AET in Oklahoma has accelerated its rate of adoption, this conclusion still has the potential to pose problems for the innovation in the confirmation stage of the innovation-decision process. According to Rogers (2003), perceived complexity can be a major impediment to an innovation's adoption. Moreover, perceptions of complexity often result in intense feelings of frustration (Rogers, 2003). As such, if SBAE teachers in Oklahoma continue to perceive the AET as being relatively complex, discontinuance may be seen as the most appropriate action.

Conclusion 5: SBAE teachers in Oklahoma perceived "concerns about time" as a strong barrier to adoption and use of the AET.

With an average work-week ranging from 45 to 65 hours (Cole, 1981), the roles and responsibilities of SBAE teachers are numerous. In addition to the basic, instructional activities that take place during the normal school day, SBAE teachers are also responsible for advising the FFA chapter, conducting SAE programs, building school and community partnerships, managing program resources and finances, maintaining an active public relations presence, and facilitating

student recruitment and retention (Roberts & Dyer, 2004; Talbert et al., 2007). As such, time is an invaluable resource for SBAE teachers (Phipps et al., 2008; Robinson et al., 2010).

Several researchers have identified time-related constraints and concerns as barriers to teachers' use and integration of computer-based and other, educational technologies (An & Reigeluth, 2011; Brickner, 1995; Coley et al., 2015; Kotrlik & Redmann, 2009; Williams et al., 2014). Specifically, An and Reigeluth (2011) found that teachers perceived a lack of time to be a major barrier to their technology integration efforts. Further, insufficient time for the planning of lessons that use technology was identified as a barrier to its integration by Coley et al. (2015), Kotrlik and Redmann (2009), and Williams et al. (2014). Another barrier found by Coley et al. (2015) concerned securing adequate time for students to use technology while at school.

In alignment with the aforementioned contributions to the literature, the participating, SBAE teachers in this study perceived "concerns about time" as a strong barrier to their adoption and use of the AET. According to Brickner (1995), "time for learning technology is scarce" (p. 39). This belief appears to be mirrored by SBAE teachers in Oklahoma, as they indicated being strongly deterred by the amount of time necessary to familiarize their students with the AET, as well as the amount of time necessary to become familiar with the AET themselves. So what are the resulting implications of this conclusion? If Oklahoma SBAE teachers perceive finding the time to familiarize themselves with this innovation as a difficult task, perhaps some are still struggling to do so. Further, if these teachers are not allocating the time to become acquainted with the system themselves, can they really expected to do so for their students?

Conclusion 6: SBAE teachers in Oklahoma categorized as laggards did not perceive themselves as being knowledgeable about the AET.

This conclusion supports Rogers' (2003) contention that later adopters are generally less knowledgeable about innovations than are earlier adopters. As discussed in Chapter II, the

knowledge stage has been identified as one of the five stages comprising the innovation-decision process (Rogers, 2003). This information-seeking stage of the innovation-decision process encompasses three distinct types of knowledge concerning the innovation in question: awareness-knowledge, how-to knowledge, and principles-knowledge (Rogers, 2003).

So which of the aforementioned types of knowledge is lacking among the Oklahoma SBAE teachers categorized as laggards? The answer to this query would not likely be awareness-knowledge, as these SBAE programs, as well as those belonging to the other four adopter categories, have, at least slightly, been using this innovation since 2012. How-to knowledge, however, could be a probable response. As mentioned previously, the participating SBAE teachers in this study collectively perceived the AET as a complex innovation. According to Rogers (2003), "in the case of innovations that are relatively complex, the amount of how-to knowledge needed for adoption is much greater than in the case of less complex ideas" (p. 173). Further, an insufficient grasp of principles-knowledge may also exist. The AET is a double-entry accounting system. As such, the underlying concepts of accounting can be contextualized as the principles-knowledge upon which this innovation functions.

Inadequate knowledge concerning the AET has the potential to pose unique implications among the SBAE teachers categorized as laggards. This is especially evident when considering how-to and principles-knowledge. If these SBAE teachers do not feel confident or competent using the AET and make no attempt to expand their how-to knowledge-base, the resulting frustration may result in the discontinuance of their adoption. Further, if these teachers are lacking a basic understanding of concepts pertaining to financial accounting, they may misuse or choose to discontinue their adoption of the AET.

Conclusion 7: Regarding adoption and use of the AET, the SBAE programs in Oklahoma with older and/or more experienced teachers were more innovative than those with younger and/or less experienced teachers.

While Rogers (2003) contended that earlier and later adopters do not generally differ in age, the findings pertaining to the personal and professional characteristics of this study's participants would suggest otherwise. Specifically, when examining the average ages of the participating SBAE teachers categorized as innovators and those categorized as laggards, the innovators were found to be significantly older than the laggards. As the teachers comprising the laggards were found to be an average of 33 years old, it can be inferred that most were born after 1980. Conversely, as the teachers comprising the innovators were found to be an average of 49 years old, majority of these teachers were likely born prior to 1980. Therefore, in accordance with Prenksy's (2001) characterizations of digital natives and immigrants, the teachers categorized as laggards would be classified as digital natives, while those categorized as the innovators would be classified as digital immigrants. According to Prensky (2001), the digital natives are generally the more technologically fluent of the two factions. However, in the context of this particular study and technological innovation, the findings indicate the opposite.

In addition to being older, the participants categorized as the innovators were also found to have more years of experience teaching SBAE than those categorized as laggards. As presented in Chapter IV, significant, positive relationships were found between age and program innovativeness score, as well as years of experience teaching SBAE and program innovativeness score. These findings were inconsistent with those of Bunch et al. (2015), who reported negative relationships between age, teaching experience, and perceived innovativeness concerning the use of interactive whiteboards among SBAE teachers in Oklahoma. Why are older, more experienced SBAE teachers in Oklahoma more innovative in the context of the AET, but less innovative in the

context of interactive whiteboards? Perhaps this discrepancy is demonstrative of the influence associated with mandated adoption decisions.

As one might infer, this study revealed a significant relationship between age and years of experience teaching SBAE. Although the AET is a relatively new innovation, the practice upon which it was founded is not quite as novel. Regarding adoption and use of the AET, perhaps older, seasoned teachers are more innovative because they have more experience with, and a better understanding of, the practice of record keeping. If this is the case, are the students of younger, less experienced teachers at a disadvantage when it comes to keeping records on the AET?

Conclusion 8: SBAE teachers in Oklahoma with more years of experience considered the AET to be less relatively advantageous and compatible than those with fewer years of teaching experience.

According to Rogers' (2003), relative advantage is the extent to which an individual perceives an innovation as being better than the one it is intended to replace. In addition, Rogers (2003) described compatibility as the extent to which an individual perceives an innovation as being in alignment with their personal values, needs, and experiences. Unlike complexity, perceptions on the basis of both of these attributes have been characterized as being positively related to the rate at which an innovation is adopted (Rogers, 2003).

In his dissertation study, Li (2004) examined the diffusion and adoption of web-based, distance education among faculty members at China Agricultural University. While Li (2004) found no significant relationships between faculty members' perceptions concerning the relative advantage of web-based, distance education and years of teaching experience, he did find a positive relationship between faculty members' perceptions concerning the compatibility of web-based, distance education and years of teaching experience. However, Li's (2004) findings are

inconsistent with those derived from this study, as significant, negative relationships were found between participants' perceptions of the AET on the basis of relative advantage and years of experience teaching SBAE, and participants' perceptions of the AET on the basis of compatibility and years of experience teaching SBAE.

As discussed in conclusion seven, when considering adoption and use of the AET, the SBAE teachers in Oklahoma with more teaching experience were generally more innovative than those with less teaching experience. In the case of many innovations, Rogers (2003) described relative advantage and compatibility as the two most important attributes. If perceptions on the basis of these attributes are so imperative to the success and rate of an innovation's adoption, why are the SBAE programs using the AET most intensely the same ones whose teachers are having difficulty recognizing its relative advantage and compatibility?

Conclusion 9: SBAE teachers in Oklahoma with more years of experience considered the AET to be less complex than those with fewer years of teaching experience.

This study revealed that SBAE teachers in Oklahoma viewed the AET as a complex innovation. Provided the negative relationship between the perceived complexity of an innovation and its rate of adoption (Rogers, 2003), this finding poses a threat to diffusion of the AET in SBAE programs in Oklahoma. What is more, this study also revealed a negative relationship between SBAE teachers' perceptions of the AET based on complexity and their years of experience teaching SBAE. Therefore, in addition to perceiving the AET as being less relatively advantageous and compatible, SBAE teachers in Oklahoma with more years of experience also perceived the AET as being less complex than those with fewer years of experience.

So why did less experienced SBAE teachers consider the AET to be more complex than their more seasoned colleagues? To revisit the discussion pertaining to conclusion seven, although the AET is a fairly new, record keeping innovation, the practice of record keeping is a

longstanding component of SAE. As such, based on teaching experience, perhaps this discrepancy of the AET's perceived complexity can be attributed to more or less experience with SAE record keeping.

Conclusion 10: SBAE teachers in Oklahoma who taught in larger SBAE programs and/or communities perceived "concerns about time" as a stronger barrier to adoption and use of the AET than those who taught in smaller SBAE programs and/or communities.

For the last several decades, SBAE teachers have struggled with time management and allocation (Goode & Stewart, 1981; Lockwood, 1976; Torres, Ulmer, & Aschenbrener, 2008; Warren & Flowers, 1993). What is more, insufficient time has been recognized as an impediment to teachers' integration and adoption of technology (An & Reigeluth, 2011; Brickner, 1995; Coley et al., 2015; Kotrlik & Redmann, 2009; Williams et al., 2014). Regarding adoption and use of the AET, this study found that the SBAE teachers in Oklahoma belonging to larger programs and communities were more concerned about time constraints than those belonging to smaller programs and communities. This finding implies that teachers might associate a greater number of students with a greater amount of time necessary to teach students how to to use the AET. Further, teachers may also associate a greater number of students with a greater amount of time necessary to assess and evaluate students' records on the AET.

Although this innovation may be new, the practice of record keeping is most certainly not. When solely considering teachers' perceptions of instruction pertaining to SAE record keeping, were these "concerns about time" a nonissue before the AET made its debut? Perhaps not. Although the practice of record keeping has long existed as an integral component of students' SAE programs (Boone, 2010; Camp et al., 2000; Davis & Williams, 1979; Ford et al., 2012; Jenkins & Kitchell, 2009; Moore, 1979; Phipps et al., 2008; Rubenstein & Thoron, 2014), it has also been acknowledged as a deterrent to their implementation (Foster, 1986; Wilson &

Moore, 2007). This begs the question: Are those SBAE teachers working in larger communities any more concerned about the time associated with keeping records on the AET than they would be if they were keeping records in a more antiquated fashion?

Conclusion 11: SBAE teachers in Oklahoma who taught in larger communities perceived "fear of technology" as a stronger barrier to adoption and use of the AET than those who taught in smaller communities.

This conclusion was derived from the findings associated with research question ten. Specifically, SBAE teachers who taught in larger cities or towns indicated a greater degree of apprehension toward technology than those who taught in smaller cities or towns. Although anxiety pertaining to computers and technology among SBAE teachers has been well-researched (Fletcher & Deeds, 1994; Kotrlik & Redmann, 2009; Kotrlik, Redmann, & Douglas, 2003; Kotrlik & Smith, 1989), a relationship of this kind has still yet to surface. How is the size of the city or town in which a SBAE teacher works linked to their perceptions of "fear of technology" as barrier to adoption and use of the AET? Perhaps these larger communities are home to bigger, more progressive school districts with rigorous technology standards and policies in place. Conversely, it could be that teachers working in smaller communities are less prone to this type of anxiety because their programs belong to smaller, less technology-driven school districts.

Conclusion 12: SBAE teachers in Oklahoma with more years of experience perceived "credibility of the AET" as a stronger barrier to adoption and use of the AET than those with fewer years of teaching experience.

Regarding technological innovations, credibility has not been exhaustively researched as a barrier to adoption and use. Yet, Li (2004) found the credibility of web-based, distance education to be a moderate barrier to its diffusion among faculty members at China Agricultural University. Saisi (2011) also found the credibility of information communication technologies to

be a moderate barrier to their diffusion among postsecondary institutions in developing countries. Likewise, the participants of this study identified "credibility of the AET" as a moderate barrier to their adoption and use of the innovation. However, an incongruence emerges when examining the relationships, or lack thereof, which involve perceptions of credibility as a barrier to diffusion.

For both Li (2004) and Saisi (2011), no significant relationships were found between their participants' perceptions of credibility as a barrier to their innovations' diffusion and professional teaching or work experience. However, this study revealed a significant, positive relationship between Oklahoma SBAE teachers' perceptions of "credibility of the AET" as a barrier to its adoption and use, and years of experience teaching SBAE. As the nature of this relationship would suggest that SBAE teachers will perceive the AET as being less credible with every additional year of experience, is it possible that these negative perceptions of the innovation's credibility could lead individuals to discontinue their adoption before reaching retirement? Or could these perceptions concerning the AET's credibility be influenced by change agents and opinion leaders over time?

Conclusion 13: Although highly predictive as a model, only one of the SBAE teacher characteristics derived from Rogers' (2003) theoretical generalizations was consistently predictive of SBAE program innovativeness in Oklahoma.

As presented among the findings related to research question twelve, the first hierarchical regression model employed to predict SBAE program innovativeness was comprised of three SBAE teacher characteristics: highest degree earned, SBAE program enrollment, and cosmopoliteness. These predictors were selected on the basis of theoretical alignment with Rogers' (2003) generalizations concerning earlier and later adopters. According to Rogers (2003), "earlier adopters have more years of formal education," as well as "larger-sized units (farms,

schools, companies, and so on) than do later adopters" (p. 288). Rogers (2003) further asserted that "earlier adopters are more cosmopolite than are later adopters" (p. 290).

This model was found to be significant, and explained approximately 7% of the variance in SBAE program innovativeness regarding adoption and use of the AET. In support of Rogers' (2003) contention that earlier adopters pursue more years of formal education, highest degree earned was found to be a significant predictor of SBAE program innovativeness in all three models tested by the researcher. In contrast with Rogers' (2003) assertion that earlier adopters are more cosmopolite than later adopters, cosmopoliteness was not found to be a significant predictor of SBAE program innovativeness in any of three models. Further incongruence with Rogers' (2003) theory was observed when examining the performance of the SBAE program enrollment variable. While Rogers (2003) would contend that having larger-sized units is a characteristic indicative of innovativeness, SBAE program enrollment was not a significant predictor in either of the first two models. Only after controlling for teacher age was it found to be significantly predictive in the third model. However, the manner in which SBAE program enrollment performed in the analysis is indicative of a suppressor effect (Field, 2013; Horst, 1966).

The results of this hierarchical regression model suggest that the innovativeness of SBAE programs in Oklahoma regarding adoption and use of the AET can be predicted by the number of degrees held by their respective teachers. What does this mean for the profession? Years of formal education is not a variable that can be easily manipulated, and it would be naïve to expect SBAE teachers to pursue another degree solely based on this finding. However, this information could be useful in identifying those in most need of in-service trainings supporting their use of the AET. Perhaps those SBAE teachers with more years of formal education will be able to assist in leading such in-service training efforts.

Conclusion 14: After controlling for years of formal education, SBAE program enrollment, and cosmopoliteness, SBAE teachers' perceptions of the AET per Rogers' (2003) attributes of innovations were found to improve the extent to which SBAE program innovativeness in Oklahoma could be predicted.

Rogers (2003) asserted that perceptions of an innovation on the basis of relative advantage, compatibility, complexity, trialability, and observability could be used to predict the rate at which the innovation is adopted. As such, SBAE teachers' perceptions of the AET in regard to Rogers' (2003) five attributes were included as predictors in a second hierarchical regression model. After adding these variables to those comprising the first model, an additional 14% of the variance in SBAE program innovativeness regarding adoption and use of the AET was explained. Of the second and third models, Model 2 was found to explain the largest change in variance. The significant predictors found in this model included highest degree earned and perceptions of the AET based on compatibility.

Having already discussed the significant predictor of highest degree earned in the previous conclusion, what are the implications for perceived compatibility as a significant predictor of SBAE program innovativeness regarding adoption and use of the AET? According to Rogers (2003), compatibility is the extent to which an individual perceives an innovation as being compatible with his or her own values, beliefs, previous experiences, and needs. Unlike highest degree earned, perceptions are malleable. As such, what measures could be taken to help SBAE teachers begin to perceive the AET as a more compatible innovation?

Conclusion 15: Regarding adoption and use of the AET, SBAE teacher age was found to be the most significant predictor of SBAE program innovativeness in Oklahoma.

After controlling for SBAE teachers' years of formal education, SBAE program enrollment, cosmopoliteness, and perceptions of the AET based on Rogers' (2003) attributes of

innovations, age was found to be the most statistically significant predictor of SBAE program innovativeness regarding adoption and use of the AET. Similar to Conclusion seven, this conclusion is also incongruent with the previous works of Rogers (2003) and Bunch et al. (2015), and thus, begs the same question: Why was age such an important factor related to the adoption of this innovation, but not to the adoption of others? Like the number of degrees earned, age is not something that can be controlled or altered by a change agency. Nevertheless, this information will be of practical use when identifying those who are more likely to adopt the innovation, and those who are not.

Recommendations for Future Practice

Although intended for SBAE practitioners and supporters in Oklahoma, these recommendations for praxis may also be of practical interest to other stakeholders engaged in SBAE. The findings and conclusions derived from this study are intended to assist Oklahoma SBAE teachers and CareerTech state staff in the identification and implementation of best practices and in-service training opportunities regarding adoption and use of the AET for SAE record keeping.

In response to the findings of this study, a number of recommendations for future practice were conceived. First, in the context of a mandate for the adoption of the AET, a low percentage of students with SAE records on the AET would generally be indicative of a low percentage of SBAE students and programs complying with the mandate. Further, if every SBAE student in Oklahoma was required to maintain SAE records on the AET, compliance with the SAE mandate instated by Oklahoma HB 3006 could also be determined. However, because students with preexisting SAE records were later permitted to choose between use of the AET or Excel record books for the duration of their SBAE careers (R. Bonjour, personal communication, April 13, 2017), noncompliance with these mandates is no longer as simple to recognize. As such, it has yet

to be determined whether the SBAE students without SAE records on the AET in 2015 were maintaining records in an Excel record book, or disregarding one or both of the abovementioned mandates altogether.

As demonstrated both anecdotally and by research, SAE has the potential to create relevance and interest among students by providing them a more individualized means of content application. If only one-fourth of all SBAE students in Oklahoma had SAE records on the AET in 2015, how can one be certain that the remaining 75% of these students were maintaining SAE programs? To avoid limiting the pedagogical benefits of SAE to a select few, SBAE teachers in Oklahoma should make concentrated efforts to encourage participation among all students enrolled in their programs. Overwhelming percentages of entrepreneurship SAE participation were found among the SBAE programs belonging to each of the five adopter categories. This entrepreneurial orientation would suggest that SBAE teachers in Oklahoma may not feel as efficacious about their abilities to initiate and supervise other types of SAE programs. While livestock SAE programs are a fixture in Oklahoma, projects of this nature are not always in alignment with the financial means or interests of every student. As such, an intensive, state-wide effort is warranted to better prepare in-service and pre-service teachers for the supervision of student projects in all six types of SAE programs.

In response to teacher age and number of degrees earned being identified as significant predictors of SBAE program innovativeness regarding adoption and use of the AET, targeted training and mentoring opportunities for younger, less educated SBAE teachers are warranted. Regarding specific topics for in-service trainings and workshops, three recommendations are proffered. As revealed by research question four, SBAE teachers in Oklahoma considered the AET to be too complex. If SBAE teachers are perceiving this innovation as being overly complicated, it is unlikely they will be able to help their students use it effectively. Therefore, to lessen this perceived complexity and aid teachers in the acquisition of how-to knowledge, the

Agricultural Education Division of CareerTech should focus on offering frequent opportunities for rigorous, in-service training concerning use and navigation of the AET. Further, to facilitate an increase in teachers' principles knowledge regarding the AET, in-service training opportunities pertaining to the fundamentals of financial accounting are also advised. Finally, because SBAE teachers in Oklahoma consider time-related constraints and concerns to be a strong barrier to their utilization of the AET, in-service trainings regarding time management may also be of use. To better prepare pre-service SBAE teachers for the field, teacher educators are encouraged provide instruction in these areas, as well.

Recommendations for Future Research

In addition to those made for future practice, this study also yielded the following recommendations for future research:

- Because the results of this study should only be generalized to SBAE teachers and programs in Oklahoma, a series of replications in other states is recommended. Further investigation of this innovation's diffusion is needed in both mandated and voluntary use contexts. In addition to allowing for comparisons to be made among different social systems, these replicated studies may allow for the identification of opinion leaders in each state (Rogers, 2003).

- A qualitative study is warranted to investigate why SBAE teachers in Oklahoma perceived the AET as being a complex innovation. Moreover, a qualitative follow-up may support the identification of specific in-service training needs of SBAE teachers in Oklahoma.

- It is to be determined whether the low percentage of SBAE students in Oklahoma with SAE records on the AET is more indicative of a limited degree of utilization of the AET, or of a limited degree of SAE participation. Because both SAE participation and

utilization of the AET have been mandated in the state of Oklahoma, additional research is recommended to address the apparent incongruence between policy and practice.

- Additional research is needed to examine why SBAE teachers in Oklahoma perceived time-related concerns as such a strong impediment to their adoption and use of the AET.

- Further research is warranted to examine why older, more experienced SBAE teachers in Oklahoma were using the AET more intensely, yet perceived it as being less relatively advantageous and compatible, than their younger, less experienced colleagues.

- Using more recent data pertaining to each Oklahoma SBAE program's utilization of the AET, this study should be replicated to examine whether or not SBAE teachers and programs in Oklahoma will respond to the innovation more positively over time. Therefore, a longitudinal investigation featuring the same phenomenon is needed.

- Because perceived compatibility was found to be a significant predictor of a SBAE program's innovativeness, perhaps further investigation is warranted to determine the specific sources of incompatibility perceived by SBAE teachers in Oklahoma, such as conflicting beliefs, cultural norms, or previous practices (Rogers, 2003).

Concluding Remarks

SBAE teachers recognize SAE as a vital component of the total SBAE program (Wilson & Moore, 2008). However, "there is a paradox between the value teachers place on SAE and the manner in which SAE is being implemented" (Wilson & Moore, 2007, p. 89). The same can be said for SAE record keeping, as teachers consider it to be an essential skill associated with the success of students' SAE programs (Boone, 2010; Camp et al., 2000; Davis & Williams, 1979; Jenkins & Kitchell, 2009; Phipps et al., 2008), yet still struggle with the practice (Layfield & Dobbins, 2002; Miller & Scheid, 1984; Wilson & Moore, 2007). Regardless of this paradox, in

both personal and professional contexts, record keeping is a highly transferrable skill (Davis & Williams, 1979). In addition to preparing students for future careers, the practice of SAE record keeping may also be used to promote personal, financial literacy among SBAE students. As such, to ensure its vitality, efforts must be made to better reap and communicate the benefits of record keeping in SBAE.

In recent times, computers have become a fixture in most educational and occupational settings (Mueller et al., 2008; Phipps et al., 2008). To better prepare students for careers in agriculture, Phipps et al. (2008) opined the need to modernize the practice of SAE record keeping. Because computerized methods of record keeping are well on their way to becoming the norm, a need exists to modernize the terminology, as well. With web-based systems like the AET boasting the ability to generate a variety of applications and reports from large-scale data sets, perhaps *SAE data management* is a more appropriate term.

Although the primary aim of this study was not to investigate the level of SAE participation among SBAE programs in Oklahoma, the findings presented the need for another study to do just that. In the meantime, what can be done to address this profession's seemingly universal struggle with the practice of SAE record keeping? Because record keeping has been identified as a barrier to SAE participation and implementation (Foster, 1986; Wilson & Moore, 2007), it is unlikely the profession will see much of an increase in SAE programming until this barrier is mitigated. Although it is yet to be determined whether the AET will be the solution to this quandary, perhaps time and further research will illuminate a preferred path for moving forward in a positive way.

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APPENDICES

APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL FORM

Oklahoma State University Institutional Review Board

Date:	Tuesday, October 11, 2016
IRB Application No	AG1633
Proposal Title:	An Examination of Oklahoma Agricultural Educators' Innovativeness and Perceptions Concerning the Mandated Use and Adoption of the Agricultural Experience Tracker
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 10/10/2019

Principal Investigator(s):

Hanna Aviles
Stillwater, OK 74078

Marshall A. Baker
458 Ag Hall
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☐ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1.Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2.Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3.Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4.Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Scott Hall (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,

Hugh Crethar, Chair
Institutional Review Board

APPENDIX B

MODIFICATION TO INSTITUTIONAL REVIEW BOARD APPROVAL FORM

Oklahoma State University Institutional Review Board

Date:	Friday, February 17, 2017	**Protocol Expires: 10/10/2019**
IRB Application No:	AG1633	
Proposal Title:	An Examination of Oklahoma Agricultural Educators' Innovativeness and Perceptions Concerning the Mandated Use and Adoption of the Agricultural Experience Tracker	
Reviewed and Processed as:	Exempt **Modification**	

Status Recommended by Reviewer(s) **Approved**

Principal Investigator(s):

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458 Ag Hall
Stillwater, OK 74078

The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed. The IRB office MUST be notified in writing when a project is complete. All approved projects are subject to monitoring by the IRB.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

The reviewer(s) had these comments:

Mod to 1) recruit subjects via the Agricultural Experience Tracker, 2) revise recruitment and follow-up scripts, 3) add a second follow up email, 4) revise estimated time for completion

Signature :

Hugh Crethar, Chair, Institutional Review Board

Friday, February 17, 2017
Date

APPENDIX C

PARTICIPANT INFORMED CONSENT FORM

College of Agricultural Sciences and Natural Resources
Department of Agricultural Education, Communications and Leadership

AN EXAMINATION OF OKLAHOMA AGRICULTURAL EDUCATORS' INNOVATIVENESS AND PERCEPTIONS CONCERNING THE MANDATED USE AND ADOPTION OF THE AGRICULTURAL EXPERIENCE TRACKER

Please read this entire page prior to beginning the questionnaire. Once you have carefully read over this page, you may indicate your consent to participate in this study by continuing to the first page of the questionnaire.

PURPOSE:
The purpose of this study, which is being conducted as a masters' thesis, is to describe the relationships between the innovativeness and perceptions of school-based agricultural education (SBAE) teachers in Oklahoma concerning the diffusion of the Agricultural Experience Tracker (AET).

PROCEDURES:
This study will require the completion of one questionnaire. This questionnaire will ask for your opinions on specified attributes of the AET, potential barriers to its use, and demographic information about yourself. Please allow approximately 10 minutes to complete the questionnaire.

RISKS OF PARTICIPATION:
There are no greater social, psychological, physical, legal, or stress-related risks associated with this study than those encountered in your daily life. However, if participating in this study brings you any stress or discomfort, you may cease your participation at any time.

BENEFITS OF PARTICIPATION:
Your participation in this study is not expected to yield any personal benefits. However, as little research exists regarding the AET, this study will work to highlight how this innovation is being received by the Oklahoma SBAE profession. By identifying Oklahoma SBAE teachers' perceived attitudes toward the AET, as well as potential barriers impacting teachers' decisions to adopt or reject it, this study may allow the state to better meet the in-service training needs of its teachers.

COMPENSATION:
No compensation will be provided for participating in this study.

CONFIDENTIALITY:
All of the information you provide will be kept confidential. You will not be identified explicitly or individually. Only numbers will be used to identify questionnaires, not names or any other personal means of identification. Records will be stored securely, and only members of the research team will be able to access them. The results of this study may be published or presented at professional conferences.

CONTACT INFORMATION:
If you would like to discuss your participation in this study, or would like to be informed of the results, you are welcome to contact any of the researchers at the following telephone numbers and e-mail addresses: Mrs. Hanna Aviles, (832) 594-6348, hanna.holsapple@okstate.edu; Dr. Marshall Baker, (405) 744-3686, bakerma@okstate.edu; Dr. Craig Edwards, (405) 744-8141, craig.edwards@okstate.edu; Dr. Shane Robinson, (405) 744-3094, shane.robinson@okstate.edu. If you have any questions about your rights as a research volunteer, you may contact the Oklahoma State University Institutional Review Board (IRB) Chair, Dr. Hugh Crethar, at 223 Scott Hall, Stillwater, Oklahoma 74078, (405) 744-3377, or irb@okstate.edu.

YOUR RIGHTS AS A PARTICIPANT:
Your participation in this study is voluntary. You will not be penalized for refusing to participate, and you are free to withdraw participation at any time.

If you do not wish to participate in this study, please exit your Internet browser at this time.

APPENDIX D

PARTICIPANT INVITATION LETTER

Good morning:

My name is Hanna Aviles, and I am currently pursuing my Master of Science in Agricultural Education at Oklahoma State University. For my thesis, I am performing a study on the Agricultural Experience Tracker (AET) and how it is being perceived by Oklahoma agricultural education teachers. As a teacher in Oklahoma, your opinions regarding the use of the AET for SAE record keeping may help the state staff better understand and address the thoughts and in-service needs of teachers across the state.

Though greatly appreciated, your participation in this study is strictly voluntary. If you choose to participate, please allow approximately 10 minutes to complete the questionnaire. In order for this study to yield the most beneficial results possible, one response from each program is needed. If you are currently working in a multi-teacher program and would like to contribute to the results of this study, please ask the teacher that is most responsible for the oversight of record keeping or use of the AET in your program to complete the questionnaire. To access the questionnaire, please follow the link below.

Regardless of your decision, thank you for your consideration.

Sincerely,

Hanna H. Aviles
Graduate Student in Agricultural Education
Oklahoma State University

Follow this link to the Survey:
Take this survey

APPENDIX E

FIRST PARTICIPANT INVITATION FOLLOW-UP LETTER

Good morning, teachers:

This is Hanna Aviles from the Department of Agricultural Education, Communications and Leadership at Oklahoma State University. Last week, I sent an e-mail inviting you to participate in my Master's thesis study on Oklahoma agricultural education teachers' perceptions of the Agricultural Experience Tracker (AET). In order for this study to help the state staff better understand your thoughts on the AET and address any in-service training needs regarding its use, this study will need participation from as many programs as possible.

If you or any other teacher in your program have not yet taken the questionnaire, please consider doing so at this time. If you would like to participate in this study and are currently working in a multi-teacher program, please ask the teacher in your program with the most responsibility related to record keeping or the AET to complete the questionnaire. For your convenience, the link to the questionnaire can be found below. Please allow approximately 10 minutes to complete the questionnaire.

Thank you for your consideration. With FFA award and degree application deadlines quickly approaching, I understand that this is a very busy time of year for you. However, if you are able to find a moment to complete this questionnaire, please understand that your response matters.

Best,

Hanna H. Aviles
Graduate Student in Agricultural Education
Oklahoma State University

Follow this link to the Survey:
Take this survey

APPENDIX F

SECOND PARTICIPANT INVITATION FOLLOW-UP LETTER

Good morning:

Recently, you should have received an invitation to participate in my Master's thesis study on the Agricultural Experience Tracker (AET) and how it is being perceived by Oklahoma agricultural education teachers. If you have already completed the questionnaire, thank you very much for agreeing to participate in what I hope to be a very important study.

As this study is quickly drawing to a close, this will be the last e-mail you receive from me requesting your participation. If you or another teacher in your program have not yet completed the questionnaire, I urge you to consider doing so now. Your response could allow the state staff to better understand agricultural education teachers' opinions of the AET, as well as address any in-service needs pertaining to its use.

Again, if you would like to participate in this study and are currently working in a multi-teacher program, please ask the teacher most responsible for the supervision of record keeping or use of the AET in your program to complete this questionnaire. To access the questionnaire, please follow the link provided below. Please allow approximately 10 minutes to fill out the questionnaire. Your participation is greatly appreciated.

Thank you for your time and consideration during this very busy time of year, and good luck to you and your students this stock show and CDE season.

Sincerely,

Hanna H. Aviles
Graduate Student in Agricultural Education
Oklahoma State University

Follow this link to the Survey:
Take this survey

APPENDIX G

SURVEY INSTRUMENT

DIVISION OF AGRICULTURAL SCIENCES AND NATURAL RESOURCES

OKLAHOMA AGRICULTURAL EDUCATORS' INNOVATIVENESS AND PERCEPTIONS CONCERNING USE AND ADOPTION OF THE AGRICULTURAL EXPERIENCE TRACKER (AET)

Please read this entire page prior to beginning the questionnaire. After you have carefully read this page, you can indicate your consent to participate in this study by continuing to the first page of the questionnaire.

PURPOSE:
The purpose of this study, which is being conducted as a master's thesis, is to describe the relationships between the innovativeness and perceptions of agricultural education teachers in Oklahoma concerning diffusion of the Agricultural Experience Tracker (AET).

PROCEDURES:
This study will require the completion of one questionnaire. This questionnaire will ask for your opinions on specified attributes of the AET, potential barriers to its use, and information about yourself. Please allow approximately 10 minutes to complete the questionnaire.

RISKS OF PARTICIPATION:
There are no greater social, psychological, physical, legal, or stress-related risks associated with this study than those encountered in your daily life. However, if participating in this study brings you any stress or discomfort at any time, you may cease your participation.

BENEFITS OF PARTICIPATION:
Your participation in this study is not expected to yield any personal benefits. However, as little research exists regarding the AET, this study will highlight how this innovation is being used by Oklahoma school-based agricultural education teachers. By identifying Oklahoma school-based agricultural education teachers' perceived attitudes toward the AET, as well as potential barriers impacting teachers' decisions to adopt or reject it, this study may allow for the state staff to better meet the inservice training needs of teachers.

COMPENSATION:
No compensation will be provided for participating in this study.

CONFIDENTIALITY:
All of the information you provide will be kept confidential. You will not be identified explicitly or individually. Only numbers will be used to identify questionnaires, not names or any other personal means of identification. Records will be stored securely, and only members of the research team will be able to access the study's data. The results of this study may be published or presented at professional conferences.

CONTACT INFORMATION:

If you would like to discuss your participation in this study, or would like to be informed of the results, you are welcome to contact any of these researchers at the following telephone numbers and e-mail addresses: Mrs. Hanna H. Aviles, (832) 594-6348, hanna.holsapple@okstate.edu; Dr. Marshall A. Baker, (405) 744-3686, bakerma@okstate.edu; Dr. M. Craig Edwards, (405) 744-8141, craig.edwards@okstate.edu; Dr. J. Shane Robinson, (405) 744-3094, shane.robinson@okstate.edu, Dr Roger Hanagriff, Texas A&M University (979) 458-3391, rhanagriff@tamu.edu.

If you have questions about your rights as a research volunteer, you may contact the Oklahoma State University Institutional Review Board (IRB) Chair, Dr. Hugh Crethar, at 223 Scott Hall, Stillwater, Oklahoma 74078, (405) 744-3377, or irb@okstate.edu.

YOUR RIGHTS AS A PARTICIPANT:

Your participation in this study is voluntary. You will not be penalized for refusing to participate, and you are free to withdraw participation in this study at any time.

If you do not wish to participate in this study, please close your Internet browser at this time.

Part I. ATTRIBUTES IMPACTING DIFFUSION OF THE AET

Below you will find a list of attributes that may impact the use of the AET in agricultural education programs. Please read each item carefully and indicate your opinion about the influence of each attribute on the use of the AET for SAE record keeping.

Relative advantage

Using the AET for SAE record keeping...

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
could be less time consuming than traditional, pen-and-paper record keeping practices	○	○	○	○	○
could allow me to supervise and assess SAE projects more effectively than traditional, pen-and-paper record keeping practices	○	○	○	○	○
could provide me access to more instructional resources pertaining to SAE supervision than traditional, pen-and-paper record keeping practices	○	○	○	○	○
could make compiling FFA degree and award applications more convenient than traditional, pen-and-paper record keeping practices	○	○	○	○	○

Compatibility

Using the AET for SAE record keeping...

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
is compatible with my teaching philosophy	○	○	○	○	○
is well-suited to my current teaching conditions	○	○	○	○	○
fits well with the way I like to supervise and evaluate SAEs	○	○	○	○	○
is readily available for my use	○	○	○	○	○
is readily available for use by my students	○	○	○	○	○

Complexity

The AET is...

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
clear and understandable	○	○	○	○	○
simple to learn	○	○	○	○	○
easy for me to use and navigate	○	○	○	○	○
easy for my students to use and navigate	○	○	○	○	○

Trialability

I have...

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
adequate opportunities to sample the AET	○	○	○	○	○
the knowledge of where I can go to satisfactorily try the AET	○	○	○	○	○
the means to experiment with the AET	○	○	○	○	○
access to someone who can help me try the AET	○	○	○	○	○

Observability

I have...

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
knowledge of teachers who are using the AET	○	○	○	○	○
opportunities to observe others using the AET	○	○	○	○	○
become aware of the benefits of the AET	○	○	○	○	○
become aware of the limitations of the AET	○	○	○	○	○

Part II. BARRIERS TO DIFFUSION OF THE AET

This section includes a list of potential barriers to use and adoption of the AET in agricultural education programs. Please read each item carefully and indicate your perception about the influence of each item on the use of the AET for SAE record keeping.

Concerns about time

	No barrier	Weak barrier	Moderate barrier	Strong barrier	Very strong barrier
Increased time for teachers to become familiar with the AET	○	○	○	○	○
Increased time for teachers to familiarize students with the AET	○	○	○	○	○
Increased time for the web-based evaluation and assessment of student records	○	○	○	○	○

Credibility of the AET

	No barrier	Weak barrier	Moderate barrier	Strong barrier	Very strong barrier
Lack of confidence or trust in the AET among agricultural education teachers and supporters	○	○	○	○	○
Concerns about the evaluation and assessment of student records using the AET	○	○	○	○	○
Concerns that the AET lowers the quality of student records	○	○	○	○	○
Concerns that the AET lowers the expectations of student records	○	○	○	○	○

Lack of support

	No barrier	Weak barrier	Moderate barrier	Strong barrier	Very strong barrier
Lack of need (perceived or real) for the AET	○	○	○	○	○
Lack of agreement concerning the role of the AET among agricultural education teachers and supporters	○	○	○	○	○
Lack of an advocate for the AET	○	○	○	○	○

Fear of technology

	No barrier	Weak barrier	Moderate barrier	Strong barrier	Very strong barrier
Threat to teachers' sense of competence and authority regarding SAE record keeping	○	○	○	○	○
Concern for the security of students' SAE records (e.g., hackers, computer viruses)	○	○	○	○	○
Concerns about potential misuse of the internet by students	○	○	○	○	○

Technical expertise

	No barrier	Weak barrier	Moderate barrier	Strong barrier	Very strong barrier
Lack of technical support from the AET	○	○	○	○	○
Lack of technical support at the school level	○	○	○	○	○
Lack of knowledge about the AET	○	○	○	○	○
Lack of teacher in-service, training or professional development opportunities featuring the AET	○	○	○	○	○

Lack of resources

	No barrier	Weak barrier	Moderate barrier	Strong barrier	Very strong barrier
Lack of adequate technology-enhanced classrooms or labs	○	○	○	○	○
Lack of adequate teacher access to computers or internet	○	○	○	○	○
Lack of adequate student access to computers or internet	○	○	○	○	○

Part III. PERSONAL AND PROFESSIONAL CHARACTERISTICS

Please provide your responses for the questions listed below.

Sex:

○ Male
○ Female

Age:

Please indicate your race/ethnicity:

- ○ White
- ○ Black or African American
- ○ American Indian or Alaska Native
- ○ Asian
- ○ Native Hawaiian or Other Pacific Islander
- ○ Other

Please indicate your teacher certification path:

- ○ Traditional certification
- ○ Alternative certification
- ○ Emergency certification
- ○ Other non-traditional certification path

What is the highest degree you have earned?

- ○ Bachelor's
- ○ Master's
- ○ Education Specialist
- ○ Doctorate
- ○ Other

Including this one, how many years have you been teaching agricultural education?

Including this one, how many years have you been teaching at your current school?

Including yourself, how many teachers are in your current agricultural education program?

In which Oklahoma FFA District are you currently teaching?

- ○ Northwest
- ○ Southwest
- ○ Central
- ○ Northeast
- ○ Southeast

What is the population of the city or town in which you live?
If you are unsure, please provide your best estimate.
Please use numbers to answer this question (e.g., 250).

What is the population of the city or town in which you teach?
If you are unsure, please provide your best estimate.
Please use numbers to answer this question (e.g., 250).

How many students are currently enrolled in your school-based agricultural education program?
Please use numbers to answer this question (e.g., 250).

How many FFA members are in your chapter?
Please use numbers to answer this question (e.g., 250).

Based on your students' current SAEs, please rank the following SAE program types from highest (1) to lowest (6) level of participation.
Each SAE program type should have a 1, 2, 3, 4, 5, or 6 indicated in the provided text box. No same digit should appear more than once.

- [ ] Entrepreneurship
- [ ] Placement
- [ ] Research
- [ ] Exploratory
- [ ] School-Based Enterprise
- [ ] Service Learning

Based on your students' current SAEs, please estimate the percentage of student participation in each of the following SAE program types.
All six answers should add up to 100 (e.g., Entrepreneurship: 30, Placement: 20, Research: 25, & Exploratory: 0, School-based Enterprise: 25, & Service Learning: 0).

Entrepreneurship	
Placement	
Research	
Exploratory	
School-Based Enterprise	
Service Learning	

In terms of importance, how would you rate the role SAE record keeping plays in students earning FFA degrees and awards?

- ○ Very important
- ○ Important
- ○ Somewhat important
- ○ Not important

Overall, how would you rate your computer skill level?

- ○ Excellent
- ○ Good
- ○ Fair
- ○ Poor

Please provide any additional comments you may have regarding the AET and your adoption of this technology.

Thank you for participating in this study!

VITA

Hanna H. Aviles

Candidate for the Degree of

Master of Science

Thesis: AN EXAMINATION OF OKLAHOMA AGRICULTURAL EDUCATORS' INNOVATIVENESS AND PERCEPTIONS REGARDING THE MANDATED ADOPTION AND USE OF THE AGRICULTURAL EXPERIENCE TRACKER

Major Field: Agricultural Education

Biographical:

Education:

Completed the requirements for the Master of Science in Agricultural Education at Oklahoma State University, Stillwater, Oklahoma in May, 2017.

Completed the requirements for the Bachelor of Science in Animal Science at Sam Houston State University, Huntsville, Texas in August, 2015.

Experience:

Graduate Teaching Assistant, Department of Agricultural Education, Communications, and Leadership, Oklahoma State University, Stillwater, Oklahoma

Professional Memberships:

Agricultural Education, Communications, and Leadership Graduate Student Association

American Association for Agricultural Education

National Association for Agricultural Educators

Vocational Agriculture Teachers Association of Texas