

Supervised Agricultural Experience: An Examination of Student Knowledge and Participation

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The purpose of this study was to investigate student Supervised Agricultural Experience (SAE) knowledge and participation. This descriptive study was conducted in 120 randomly selected agricultural education programs throughout four purposively selected states representative of the National FFA regions. Students completed a questionnaire assessing knowledge of the five SAE categories. According to findings of this study, 46.1% of the students surveyed reported having a SAE program (n = 473). Students on average could only correctly categorize between three and four of the five SAE project scenarios and approximately one-third of the students surveyed in Indiana, Missouri, and Utah could categorize all five. Students appeared to be able to correctly identify the improvement, research and experimentation, and placement SAE categories more frequently. Those surveyed without a SAE program were either not familiar or somewhat familiar with the five SAE categories. The average number of classroom days spent on SAE instruction since enrolled in agricultural education courses varied from nine to 34 and half of the students in three of the states did not receive a grade for their SAE program or record book in agricultural education courses. Students surveyed did not believe they needed more classroom instruction from their teacher about SAEs.

Keywords: Supervised agricultural experience (SAE); experiential learning; student knowledge of SAE, SAE participation

Introduction and Theoretical Framework

Supervised Agricultural Experience (SAE) programs are accepted as an integral component of the agricultural education model throughout secondary agricultural education (Croom, 2008). However, a growing concern over the lack of student SAE participation has developed among members of the profession. Although new approaches to SAE have been conceived to target the audience of non-traditional agricultural students, a decline in SAE participation seems to be occurring (Croom, 2008). Much research has been conducted to address the theoretical value and perceptions of SAE (Barrick, 1991; Boone, Doerfert, & Elliot, 1987; Camp, Clark, & Fallon, 2000; Case, 1983; Cheek, Arrington, Carter, & Randell, 1994; Dyer & Osborne, 1995, 1996; Dyer & Williams,

1997; Foster, 1987; Moore, 1987; Rayfield & Wilson, 2009; Roberts, 2006; Steele, 1997; Stewart & Birkenholz, 1991; Swortzel, 1996; Whaley & Lucero, 1993; White & Pals, 2004; Wilson & Moore, 2007), but very little data could be found on increasing their implementation. This study sought to assess student SAE knowledge and participation, in order that methods may be cultivated to diminish the decline and improve student knowledge. According the American Association for Agricultural Education's National Research Agenda (Doerfert, 2011), this study aligns with priority area four by examining the role of motivation, self-regulation, metacognition, and reflection in developing meaningful, engaged learning experiences in agricultural education contexts. By understanding the level of student SAE knowledge, the agricultural education

community may be able to develop more high-quality experiential learning opportunities and increase SAE participation.

SAE programs in agricultural education have developed since Stimson's *home project* method to include present day agribusiness endeavors, agriscience research, agricultural service-learning opportunities, and, agricultural placement programs, as well traditional production agriculture (NAAE, 2012). The National FFA Organization (2012) lists the following categories of SAEs: exploratory, experimentation and research, entrepreneurship and ownership, placement, and improvement. A SAE is "a practical application of classroom concepts designed to provide 'real world' experiences and develop skills in agriculturally related career areas" (National FFA Organization, 2012, p.3). Since the organization of agricultural clubs and the implementation of the SAE predecessor, Stimson's home projects, agricultural education students have been *learning to do* through participation in SAE programs.

Conflict has risen over the years, as many educators differ on the meaning of the word *agricultural* in SAE. Some educators believe agricultural to only be defined as farming, while others define agricultural as any career connected to food and natural resources. The differing philosophies result in educators considering the qualifications of SAE implementation diversely. Nevertheless, most agricultural educators agree that SAE programs should be required of all agricultural students (Croom, 2008). Knobloch (1999) summarized the benefits of SAEs well in his article for *The Agricultural Education Magazine*:

Supervised agricultural experiences implemented in agricultural education programs by its true definition of students experiencing agriculture with adult supervision have proven to help students apply knowledge, clarify career choices, solve problems through decision making, develop responsibility, and learn agricultural skills through practical experiences. (p. 16)

Furthermore, student benefits resulting from experience programs include personal finance,

maturation, development of employment skills, and recognition for achievements (Stewart & Birkenholz, 1991).

To help agricultural educators evaluate the success of their program National Quality Program Standards for Secondary (Grades 9–12) Agricultural Education were established in 2009 through a project funded by The National Council for Agricultural Education. According to the standards identified in the project, agricultural education programs are evaluated using ranking scores for a series of quality indicators for each standard. Several standards in the project address the requirement of all students to have a quality SAE program (The National Council for Agricultural Education, 2009). Standard 2: Experiential Learning of the National Quality Program Standards (The National Council for Agricultural Education, 2009) states that "education is enhanced through active participation by all students in a year-round experiential learning program" (p. 25). In order to meet the criteria for Standard 2, seven quality indicators for SAE participation, recordkeeping, and supervision must receive an exemplary indicator score by an agricultural program. Standard 1: Program Design and Instruction contains the quality indicator that "experiential learning (SAE) and leadership and personal development (FFA) are integrated throughout the instructional program" (p. 6). In 2009, a Delphi study was conducted to identify quality indicators for SAE programs. As a result several indicators arose, including the need for a diversity of SAEs to be promoted, teacher supervision of SAEs, up-to-date SAE records provided by students, SAE assistance provided by instructors, parents, and employers, involvement of goal setting, and student satisfaction with SAEs (Jenkins & Kitchel, 2009).

While the integrated three-component model of agricultural education (Phipps & Osborne, 1988) depicts equal emphasis on each part, SAE programs appear to be the weakest (Croom, 2008). Less than one-third of agricultural educators in the nation reported 75.0% or higher participation rate in SAE (Wilson & Moore, 2007). In New York, Penrod, as cited in Steele (1997), reported as few as 30.0% of agricultural education students in the

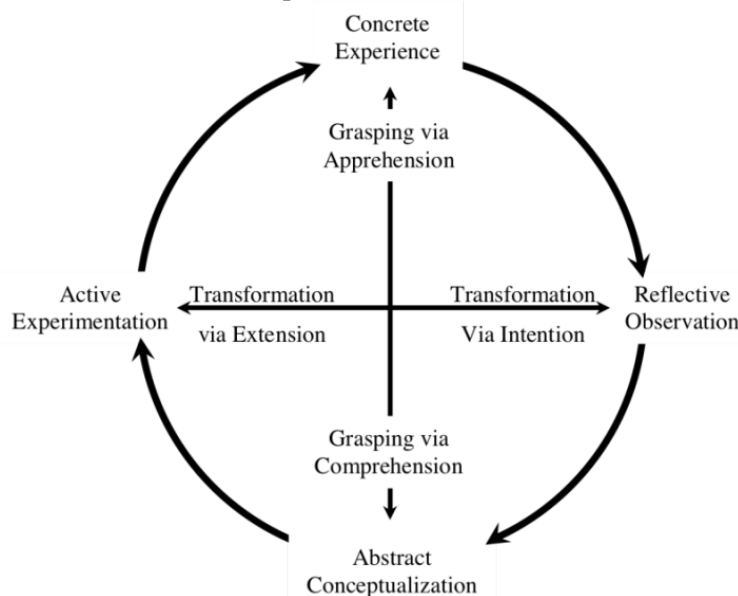
state had SAE programs in 1982. Based on these statistics, teachers need help in improving the quality of the SAE component of their program, but this cannot be accomplished if barriers to participation are not identifiable. Many perceptions exist as to why participation has decreased by students enrolled in agricultural education courses. A few of these factors, identified by agricultural educators, include: lack of time, increased number of students in the classroom, complicated record-keeping, limited school and community opportunities, lack of facilities, low student desire, lack of agricultural background, and a lack of knowledge of the newer categories of SAE (Steele, 1997; Wilson & Moore, 2007). Unfortunately, none of these perceived factors have data to validate their causation in the growing decline of participation by agricultural students in SAE programs. In addition, no data can be found to determine the barriers to SAE participation from the agricultural students' perspective.

The theoretical framework for SAE is rooted in experiential learning. One of the first models of experiential learning was developed by John Dewey. In *Experience and Education*, Dewey (1938) asserted that all learning occurs from experience. A cyclical process where subsequent experiences build on past

experiences was indicated to show how people learn from experience:

- (1) observation of surrounding conditions;
- (2) knowledge of what has happened in similar situations in the past, a knowledge obtained partly by recollection and partly from the information, advice, and warning of those who have had a wider experience; and
- (3) judgment which puts together what is observed and what is recalled to see what they signify. (Dewey, 1938, p. 69)

Several other experiential learning theories have built upon Dewey's foundational work, including Kolb's (1984) Model of the Experiential Learning Process. Kolb considered learning to be a process of "creating knowledge through the transformation of experience" (p. 38). Similarly to Dewey, Kolb described experiential learning through a cyclical model which contains four stages: (a) the concrete experience (CE); (b) reflective observation (RO) on the concrete experience; (c) abstract conceptualization (AC) of the experience; and (d) active experimentation (AE) based on comprehension of the experience (Figure 1). According to Kolb, this learning cycle can begin at any stage and is an on-going process.



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Figure 1. Model of the Experiential Learning Process (Kolb, 1984)

Experiential learning in agricultural education adheres to the cyclical process of Kolb's (1984) model. The cyclical process is demonstrated through experiences students encounter both in and out of the classroom. Students have CE in agricultural education classes by participating in hands-on activities or engagement in learning, which can spark their interests. From here, students move into RO and begin to internalize what they experienced in class by thinking and reflecting on the experience. In the next stage of AC students may begin to develop their own hypotheses and generalizations about the experience from the classroom. Students find ways to apply what was learned in new ways based on their interpretations of concepts presented from the experience. This mode of learning is also called comprehension. Through participation in activities such as FFA career development events and SAE programs, students complete the cycle of Kolb's model by entering AE and testing the new hypotheses and generalizations created based on their initial agricultural education classroom experience. This study investigated student comprehension of the five SAE categories from classroom instruction based on the AC stage of the Kolb (1984) Experiential Learning Process.

Purpose and Objectives

The purpose of this study was to assess student SAE knowledge and participation. The research objectives of this study were to:

1. Identify the number of student SAE participants.
2. Examine student knowledge of SAE categories.
3. Examine non-participating students' level of familiarity with SAE categories.
4. Explore classroom SAE instruction practices.

Methods and Procedures

To assess student SAE knowledge and participation, a study of enrolled agricultural education students in 120 secondary agricultural

education programs, 30 per state, one state per National FFA region, was conducted. This study was descriptive in nature, in that it attempted "to describe a given state of affairs as fully and carefully as possible" (Frankel & Wallen, 2009, p. 390) and utilized a questionnaire as the method of data collection. One state per National FFA region was purposively chosen based on similar size and structure within the state FFA divisions (districts/areas/regions), for a total of four states. Frankel and Wallen (2009) state investigators can use personal judgment to select a sample based on previous knowledge of a population and the specific purpose of the research. Each division per state chosen included an urban city center with agricultural education programs and outlying rural/suburban agricultural education programs based on the U.S. Census. Thirty programs were randomly selected from each state's purposively chosen division to participate in the study, with a total of 120 agricultural education programs contacted. Teacher contact information was verified through state teacher directories, school websites, and/or personal communication before questionnaire packets were distributed. Teachers were asked to administer the questionnaire to students who had completed at least one year of agricultural education instruction registered in their class with the largest enrollment. It is noted that a limitation of this study exists due to the nature of teacher-administered questionnaires. It was assumed that teachers followed the administration instructions provided as outlined to maintain consistency and did not influence student response to create bias. Researchers also assumed that students completing the questionnaire had received SAE instruction because they had completed at least one year of agricultural education instruction.

A researcher-designed instrument was used in this study to assess student SAE knowledge and participation. Content and face validity of the instrument were determined by an established panel of 10 experts prior to a pilot study. Reliability was determined from data collected by a pilot study using Cronbach's Alpha. This coefficient is a general form of the Kuder-Richardson KR20 formula to be used in

calculating the reliability of items (Fraenkel & Wallen, 2009) and is the average of the correlation coefficient for each split determined from the split-half reliability method (Field, 2009). The instrument was composed of five constructs and a reliability coefficient was determined for construct one ($\alpha = 0.75$), construct two ($\alpha = 0.95$), construct three ($\alpha = 0.85$), construct four ($\alpha = 0.97$), and construct five ($\alpha = 0.71$). The first construct of the instrument assessed SAE knowledge by asking students to correctly identify the five SAE categories based on a described project scenario provided. Construct two asked students to identify their participation in SAE programs by responding *yes* or *no*. Construct three of the instrument asked questions specifically related to a participating student's SAE program and the amount of classroom SAE instruction practices they received since enrolled in agricultural education courses. Students who indicated they did not participate in SAE programs were asked to rate their level of familiarity with the five SAE categories and indicate the amount of classroom SAE instruction practices they received since enrolled in agricultural education courses. Construct four assessed students' level of agreement with factors influencing SAE participation. The fifth construct of the instrument gathered basic demographic information about the students.

For data collection, Dillman, Smyth, and Christian's (2009) Tailored Design Method was followed. Five points of contact with participants were made and were considered desirable according to the Tailored Design Method: a brief pre-notice letter or e-mail, a questionnaire mailing with a cover letter via paper mail or e-mail delivery, a thank you or reminder letter via paper mail or e-mail delivery, a replacement questionnaire via paper mail, and a final contact via paper mail or e-mail. Teachers were asked to have the students in their largest class who had completed at least one year of agricultural education instruction complete the study questionnaire. A pre-notice was sent through e-mail to the lead teacher or agricultural department head of the 120 randomized agricultural education programs seeking participation. Teachers were asked to respond to the pre-notice e-mail indicating their

preferred method of questionnaire delivery via paper or online. Only one teacher preferred to administer the questionnaire online to students. The remaining teachers received paper questionnaires in the first packet mailed. If teachers did not indicate the number of students enrolled in their largest class, 25 questionnaires were sent in all packets. The questionnaires were distributed initially four days following the pre-notice email. Ten days later, the first reminder was sent to non-respondents. The programs yet to return completed questionnaires were randomly selected for the following two reminder delivery method groups: e-mail or paper. The first reminder was sent to the non-respondent programs via the delivery method of the group they were selected in. Seven days after the first reminder was sent, a second paper questionnaire packet was sent to the programs that had still not completed the questionnaires. After 10 days, a second reminder was sent to the non-respondent programs using the opposite delivery method from the first reminder. Initial data collection was completed one week from when the second reminder was sent.

Ten days after the initial data collection was completed, non-respondents were contacted through a telephone call to solicit participation in the study. The non-respondents willing to participate in the study received a third packet of questionnaires by mail. Five days after the third questionnaire packet was distributed, a reminder was sent to the non-respondents of the non-respondent group using the opposite reminder delivery method previously for the second reminder. Data collection was completed seven days after the reminder to the non-respondents of the non-respondent group was sent. One program from the non-respondent group returned a packet of completed student questionnaires.

To address non-response error, it was attempted to compare respondents to non-respondents; however, because less than 20 non-respondent responses were received the statistical power was too low to detect differences between respondents and non-respondents (Lindner, Murphy, & Briers, 2001). Instead, using Method 1 (Lindner, Murphy, & Briers, 2001) to address non-response error, researchers combined all responses and

compared early to late respondents. There were no statistically significant differences between the early and late respondents.

At the conclusion of the study, 52 of the 120 randomly selected programs returned questionnaires for a total response rate of 43.3% ($N = 120, n = 52$). As a result 1,038

questionnaires were completed by students in the randomly selected programs of the purposively chosen divisions of the four states selected for this study. Table 1 illustrates the program response rate and number of students who completed the questionnaire per state.

Table 1
Program Response and Number of Completed Surveys

	Programs Contacted	Programs Responded	Students
	<i>f</i>	<i>f</i>	<i>f</i>
Florida	30	19	432
Indiana	30	9	162
Missouri	30	15	253
Utah	30	9	191
TOTAL	120	52	1,038

Note. Eight programs elected not to participate in the study and were not included in the number of programs responded for each state.

Data analysis was conducted using the Statistical Package for Social Sciences for Windows version 17.0. Descriptive statistics were generated for student SAE participation, knowledge, and SAE or record book grade in agricultural education courses. Means and standard deviations were calculated for the SAE knowledge score, level of familiarity with SAE categories, and classroom SAE instruction.

Findings

This descriptive study was able to meet the first objective goal by identifying the number of SAE participants from students surveyed in

Florida, Indiana, Missouri, and Utah. From the responses of the four states ($N = 1,027$), 46.1% ($n = 473$) of students reported having a SAE program and 53.9 % ($n = 554$) reported not having a SAE program. The breakdown of SAE participation by each state is displayed in Table 2. Missouri students that were surveyed reported the highest SAE participation (62.0%, $n = 155$). Students surveyed in Utah had the second highest level of SAE participation (61.7%, $n = 116$). Forty-percent or less of students surveyed in Florida (31.9%, $n = 137$) and Indiana (40.6%, $n = 65$) reported having a SAE project.

Table 2
Student SAE Participation by State (N = 1,027)

SAE Participation	Florida ^a		Indiana ^b		Missouri ^c		Utah ^d	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Yes	137	31.9	65	40.6	155	62.0	116	61.7
No	292	68.1	95	59.4	95	38.0	72	38.3

Note. Valid percentages are reported; ^a $n = 429$. ^b $n = 160$. ^c $n = 250$. ^d $n = 188$.

Examining student SAE knowledge of the five categories was deemed important by the researchers involved in this study. In order to accomplish this second objective, students were asked to correctly identify the SAE category of

five SAE project scenarios. A mean score indicating knowledge of the five SAE categories was calculated for each state, as seen in Table 3. Students could receive a mean score of 0 to 5 depending on the number of correctly

categorized SAE project scenarios. Students surveyed in Utah received the highest mean score ($M = 3.17$), being able to correctly identify between three and four of the five SAE categories on average. Florida students

surveyed received the lowest mean score ($M = 1.63$), being able to only correctly identify between one and two of the five SAE categories on average.

Table 3
Mean Score Indicating Knowledge of the Five SAE Categories ($N = 1,038$)

States	<i>M</i>	<i>SD</i>
Florida ^a	1.63	1.64
Indiana ^b	2.61	1.85
Missouri ^c	2.89	1.98
Utah ^d	3.17	1.76

^a $n = 432$. ^b $n = 162$. ^c $n = 253$. ^d $n = 191$.

Frequencies and percentages were also calculated to determine the total number of correctly identified SAE categories by the students surveyed in each state and are shown in Table 4. More students surveyed in Missouri

(38.3%, $n = 97$) and Utah (38.2%, $n = 73$) could identify all five categories of SAE than in Florida (8.3%, $n = 36$) and Indiana (27.8%, $n = 45$).

Table 4
Total Number of Correctly Identified SAE Categories by Students ($N = 1,038$)

# Correct	Florida ^a		Indiana ^b		Missouri ^c		Utah ^d	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
0	165	38.2	28	17.3	49	19.4	18	9.4
1	62	14.4	27	16.7	34	13.4	25	13.1
2	73	16.9	25	15.4	19	7.5	24	12.6
3	69	16.0	27	16.7	42	16.6	36	18.8
4	27	6.3	10	6.2	12	4.7	15	7.9
5	36	8.3	45	27.8	97	38.3	73	38.2

Note. Valid percentages are reported; ^a $n = 432$. ^b $n = 162$. ^c $n = 253$. ^d $n = 191$.

Additionally, frequencies and percentages were calculated to show how often each SAE category was correctly identified by the students surveyed (Table 5). Students from all four states most commonly were able to correctly identify the improvement, research and experimentation, and placement SAE categories. Overall, students surveyed in Florida appeared to

incorrectly identify each of the five categories of SAE more frequently than students from Indiana, Missouri, and Utah. Students surveyed in Utah appeared to display the strongest knowledge of SAE with each category being correctly identified by at least 60.0% of the participants.

Table 5
Student Knowledge of the Five SAE Categories (N = 1,013)

States	Exploratory		Research & Experimentation		Entrepreneurship & Ownership		Placement		Improvement	
	f	%	f	%	f	%	f	%	f	%
Florida ^a										
Correct	112	26.6	168	39.9	84	20.0	173	41.1	165	39.2
Incorrect	309	73.4	253	60.1	337	80.0	248	58.9	256	60.8
Indiana ^b										
Correct	81	51.6	97	61.8	70	44.6	86	54.8	89	56.7
Incorrect	76	48.4	60	38.2	87	55.4	71	45.2	68	43.3
Missouri ^c										
Correct	137	54.8	153	61.2	140	56.0	142	56.8	159	63.6
Incorrect	113	45.2	97	38.8	110	44.0	108	43.2	91	36.4
Utah ^d										
Correct	113	61.1	118	63.8	114	61.6	124	67.0	135	73.0
Incorrect	72	38.9	67	36.2	71	38.4	61	33.0	50	26.9

Note. Valid percentages are reported; ^an = 421. ^bn = 157. ^cn = 250. ^dn = 185.

Examining non-participating students' level of familiarity with SAE categories was the third objective identified for this study. Students who reported not having a SAE program (N = 554) were asked to rate their level of familiarity

with the five SAE categories on a scale of 1 (Not Familiar) to 5 (Very Familiar). Students in Florida, Indiana, Missouri, and Utah reported either being not familiar or somewhat familiar with the five SAE categories (Table 6).

Table 6
Level of SAE Category Familiarity by Students Without a SAE (N = 433)

SAE Categories	Florida ^a		Indiana ^b		Missouri ^c		Utah ^d	
	M	SD	M	SD	M	SD	M	SD
Exploratory	1.84	0.90	1.76	0.93	1.90	1.01	2.10	1.05
Research and Experimentation	2.06	1.00	1.94	1.03	1.97	1.02	2.12	1.04
Entrepreneurship and Ownership	2.11	1.05	1.75	1.75	2.62	1.16	2.44	1.21
Placement	1.99	1.01	1.71	1.71	2.52	1.13	2.16	1.14
Improvement	2.15	1.11	1.91	1.91	2.33	1.17	2.15	1.11

Note. Scale: 1 = Not Familiar; 2 = Somewhat Familiar; 3 = Moderately Familiar; 4 = Very Familiar; ^an = 214. ^bn = 80. ^cn = 73. ^dn = 66.

The final objective of this study was to explore classroom SAE instruction practices. Researchers asked students to indicate the number of days their teacher had taught about SAE programs since they had been enrolled in agricultural education courses. It is important to keep in mind when viewing Table 7 that the average number of completed agricultural education courses was two as reported by the students surveyed in each state in a separate section of the questionnaire. The mean number

of days students received classroom SAE instruction since they had been enrolled in agricultural education courses varied from nine to 34. Based on the responses of the students surveyed, Missouri provided the most days of classroom SAE instruction (M = 34.13, SD = 47.08). Students surveyed in Florida received the least amount of classroom SAE instruction days (M = 9.87, SD = 13.99).

Table 7
Days of Classroom SAE Instruction Received by Students (N = 719)

States	<i>M</i>	<i>SD</i>
Florida ^a	9.87	13.99
Indiana ^b	13.41	21.69
Missouri ^c	34.13	47.08
Utah ^d	11.24	13.53

^a*n* = 257. ^b*n* = 127. ^c*n* = 180. ^d*n* = 155.

Table 8 also helps describe classroom SAE instruction practices by showing the number of students surveyed in each state that reported receiving a grade in their agricultural education course for their SAE program or

record book. According to the students surveyed, more students in Missouri (88.3%, *n* = 204) received a grade for their SAE or record book than in Utah (51.1%, *n* = 91), Florida (45.1%, *n* = 156), or Indiana (38.9%, *n* = 56).

Table 8
SAE or Record Book Included as Part of Grade in Agricultural Courses (N = 899)

Response	Florida ^a		Indiana ^b		Missouri ^c		Utah ^d	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Yes	156	45.1	56	38.9	204	88.3	91	51.1
No	190	54.9	88	61.1	27	11.7	87	48.9

Note. Valid percentages are reported; ^a*n* = 346. ^b*n* = 144. ^c*n* = 231. ^d*n* = 178.

Students were additionally asked to rate their level of agreement with a statement pertaining to SAE instruction received using a Likert-type scale with 1 indicating *Strongly Disagree* and 5 indicating *Strongly Agree*. The statement asked: "I need more classroom instruction from my teacher about SAEs." Students surveyed in Missouri (*M* = 2.66, *SD* = 1.06), Florida (*M* = 2.75, *SD* = 1.13), Indiana (*M* = 2.89, *SD* = 1.04), and Utah (*M* = 2.98, *SD* = 1.00) on average disagreed with this statement and did not believe they need more classroom instruction from their teacher about SAEs.

Conclusions, Implications, and Recommendations

SAE participation is believed to be a foundational piece of a student's experience according to the integrated three-component model. If agricultural education programs are to follow the model, all students should not only be engaged in classroom instruction and agricultural youth organizations, but SAE programs as well (Phipps & Osborne, 1988). The results of this study show that SAE

involvement by the students surveyed in Florida, Indiana, Missouri, and Utah does not adequately represent the integrated three-component model. Of the students surveyed in this study from the four states, 46.1% reported having SAE program. These numbers support prior research that student SAE participation is declining (Croom, 2008).

Steele (1997), along with Wilson and Moore (2007), identified a lack of knowledge of newer SAE categories as a factor contributing to declining SAE participation. Before a relationship between student SAE knowledge and participation can be determined, it was necessary to initially assess student SAE knowledge. Researchers in this study asked students to identify the categories of SAEs from five different SAE project scenarios described. On average, the students surveyed in Utah could correctly categorize between three and four of the five SAE project scenarios. Indiana and Missouri students surveyed were able to categorize between two and three of the five SAE project scenarios. This number was lower in Florida where the students surveyed on average only correctly categorized between one

and two SAE project scenarios. Approximately one-third of the students surveyed in Indiana, Missouri, and Utah were able to correctly categorize all five SAE project scenarios. However, in Florida, over one-third of the students surveyed could not correctly categorize any of the five SAE project scenarios.

When looking at the categories individually, each SAE category was correctly identified by at least 50.0% of the students surveyed in all states except Florida. Students most commonly were able to correctly identify the improvement, research and experimentation, and placement SAE categories. Non-participating student SAE knowledge was also examined by having the students rate their level of familiarity with the five SAE categories. Overall, students in all four states reported either being not familiar or somewhat familiar with the five SAE categories. This data concerning student SAE knowledge concludes that it is lacking. In addition, this not only confirms previous research that students are not completely familiar with the categories of SAE still considered new, such as exploratory, but that they are not very familiar with all five SAE categories either. Overall, the performance of students demonstrated a stronger SAE knowledge in Missouri and Utah than in Florida and Indiana. However, none of the four states validated above-average knowledge of the five SAE categories.

A potential factor influencing student SAE knowledge is the amount of classroom SAE instruction they receive. The importance of this is emphasized by the National Quality Program Standards for Secondary (Grades 9–12) Agricultural Education which states that SAE should be “integrated throughout the instructional program” (The National Council for Agricultural Education, 2009, p. 6). With students reporting in all four states that they had completed two agricultural education courses on average, the number of classroom instructional days spent on SAE varied from nine to 34. Students surveyed in Florida reported receiving about nine days of classroom SAE instruction, while Missouri students reported receiving about 34 days. The number of days students received SAE instruction in the classroom were somewhat similar in Indiana (13 days) and Utah (11 days).

If SAE is to be integrated into the instructional component of a complete agricultural education program, it is thought that a SAE program or record book should be a portion of the student’s grade in agricultural education courses (Talbert, Vaughn, Croom, & Lee, 2007). According to the students surveyed, more students in Missouri appeared to receive a grade for their SAE program or record book than in the other three states. Approximately half of the students in Florida, Indiana, and Utah reported they did not receive a grade in agricultural education courses for their SAE program or record book. 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.

Students were additionally asked to rate their level of agreement with a statement pertaining to SAE instruction received. Students surveyed in Florida, Indiana, Missouri, and Utah did not believe they needed more classroom instruction from their teacher about SAEs. This would make sense if students had a thorough knowledge of SAE; however, based on the data from this study, they did not and perhaps should receive more classroom SAE instruction from their teacher even if they do not feel it is necessary.

With this study, a snapshot of student SAE knowledge and participation in Florida, Indiana, Missouri, and Utah has been provided. Although the results are not generalizable to all students enrolled in agricultural education, they provide insight into ways to improve student SAE knowledge and participation, as well as the implementation of the SAE component of agricultural education programs.

It is apparent that the students surveyed in this study are not knowledgeable of all five SAE categories. A vital point for teachers to recognize is the necessity of teaching and discussing all five categories of SAEs in their classroom. Many students may not have a SAE program because they lack knowledge and familiarity of the five SAE categories. Teachers should plan to and provide continuous instruction related to SAE throughout the year in each agricultural education course, not just a short unit or only to freshman students.

Instruction needs to be more thoroughly integrated in the curriculum of agricultural education courses. SAE curriculum should consist of content lessons and demonstrations, application of content, and assessment and supervision of student performance. In addition, a discussion of SAE opportunities in all areas of agricultural education would be beneficial to students to help show the connection between class content and the benefits of project-based learning through SAE. There is no current research to determine the adequate number of classroom instructional days devoted to SAE that are needed to increase student knowledge; however, based on Kolb's (1984) Experiential Learning Process, agricultural educators perhaps need to focus on the AC stage when teaching students about the SAE component of the program. To ensure student comprehension and retention of all aspects of SAE, quality, detailed, and integrated instruction should be provided continuously. An increase in a student's knowledge and awareness of SAE could positively influence their participation.

Opportunities for exploratory and entrepreneurship SAE programs, along with improvement, research and experimentation, and placement SAE programs should be encouraged and supervised by the teacher for all students. Many students may feel they are unable to participate in a SAE program if they do not mimic the "popular" SAE type of their program. Accomplishing this feat may require the teacher to invest time in professional development which increases their own familiarity with the SAE categories and numerous opportunities. Following the integrated three-component agricultural education model, it makes logical sense to parallel student SAE programs with the degree requirements in the FFA. Students who are earning their Discovery or Greenhand degrees should participate in exploratory and improvement SAE programs. A natural progression in experiences is provided with simultaneous participation in FFA degree programs. While a national organization's degree requirements should not dictate or limit SAE opportunities, it does provide a starting point for students and teachers.

As Jenkins and Kitchel stated in their 2009 study, several states have SAE program

standards and quality indicators established, but more often than not these are self-administered and voluntary. The standards and quality indicators content and format differ drastically from state to state. In this study, Missouri and Utah not only had the highest number of student SAE participants, but also appeared to be more knowledgeable of the SAE categories. It would be advantageous for states to begin collaborating to improve SAE instruction and curriculum across the board. Each state agricultural education program has something valuable to bring to the discussion table; the more we begin to utilize the plethora of SAE knowledge and resources in our own profession across the country, the more we can improve and expand the use of SAE in agricultural education.

The results of this study provide researchers with several opportunities for further SAE research. Not only should this study be replicated in other states, but a qualitative analysis of student SAE knowledge and perceptions would add depth and additional clarity to understanding student SAE participation. Regarding classroom SAE and recordkeeping instruction, what is an effective amount of time teaching should be devoted to SAE and recordkeeping to increase student knowledge and participation? Does a relationship exist between the number of instructional days students receive about SAE and their SAE participation? The implementation of SAE curriculum in an agricultural education course and the change in student SAE knowledge should also be investigated. A synopsis of the methods teachers with high student SAE participation rates use to integrate SAE instruction into the overall curriculum of their agricultural education program would be extremely beneficial for practitioners. A comparison of teacher and student perceptions related to SAE would be interesting to discuss as well.

Researchers should also begin assessing current agricultural educators' knowledge of SAE opportunities and types, as a lack of teacher familiarity could be a cause for low student SAE participation. A deeper look into innovative practices of teacher educator programs to ensure future agricultural educators are trained in SAE could help identify successful ways to

emphasize SAE for all teacher educator programs. This could be accomplished by incorporating shadowing experiences related to SAE earlier in the teacher preparation coursework or by requiring SAE visit completions during required clinical experiences.

Finally, an analysis of the current SAE categories should be conducted. Are all opportunities for experiential learning in agricultural education reflected in the five SAE categories? Four stages of experiential learning exist in Kolb's (1984) model; SAE programs often represent the AE or CE stages in the entire agricultural education experience of students. Simultaneously, the experience of having a SAE program in and of itself guides students through all four stages of experiential learning. With current practices in SAE mainly focused on the AE and CE stages of a student's overall experience in agricultural education, the lack of RO and AC stages may decrease the benefit students can receive from participation, resulting in its decline. Are mechanisms in place for students to conduct SAE programs that are solely a portion of the RO or AC stages in agricultural education? Is it time to expand and redefine SAE to ensure all four stages of learning will occur? Retallick and Martin (2008) posed the question, "Should SAE and FFA continue to be an integral part of secondary agricultural education even though [there is] an

indication that it is not occurring in practice" (p. 36)? Assessing the SAE needs of students would give a clearer picture to answer these types of questions. A redefinition of SAE could provide a clearer, more consistent set of expectations for teachers, students, and stakeholders. It would be beneficial for the agricultural education community to continue addressing the concerns surrounding student SAE knowledge and participation.

Although it was not an objective of this study, the results of the data collection procedures are noted. Recent research studies in agricultural education utilize electronic questionnaires to collect data from participants but report low response rates. In this study, the lead agricultural teacher was provided the opportunity to select their most convenient method of questionnaire administration to students, either by paper or electronically. Of the 120 agricultural teachers contacted for participation, only one selected to administer the questionnaire to students electronically. Fifty-one programs completed and returned the paper questionnaire packets. A preference for paper questionnaires versus electronic was obviously displayed by the teachers in this study. Further investigation into identifying successful methods of data collection for agricultural education research could potentially improve response rates to studies conducted.

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