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Identifying the Perceptions, Barriers, and Implementation of Middle School Supervised Agricultural Experiences

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Abstract

Although School based agricultural education (SBAE) teachers have a variety of responsibilities within a comprehensive program, supervised agricultural experience (SAE) programs are considered an intracurricular component. Unfortunately, the ability for teachers to plan for and facilitate SAEs has been reported as lacking. The purpose of this study was to identify the current perceptions, barriers, and implementation of current middle school SAEs in the Southeast United States, which was carried out by a modified Delphi approach to reach consensus on the perceptions, barriers, and implementation of middle school SAEs from a panel of experts. After three rounds, 18 items achieved consensus related to perceptions of Middle School SAE integration, 19 items outlining barriers for Middle School SAE implementation, and 22 items indicating best practices for Middle School SAE integration. When we consider the uniqueness of middle school SBAE programs, the overall list of perceptions, barriers, and best practices is of great value for future implementation as additional programs are added. Recommendations for practice begin with purposeful professional development opportunities specific for middle school SBAE teachers.

Introduction

Students receive experiential learning through supervised agricultural experience (SAE) to develop industry and career-based competencies (National Council for Agricultural Education [NCAE], 2012). Although School based agricultural education (SBAE) teachers have a variety of responsibilities within a comprehensive program, SAE programs are considered an intracurricular component (NCAE, 2012). SAE programs have been an integral component of SBAE for over a century (Rubenstein et al., 2014), most notably demonstrating an increase in the employability skills of students (Haddad & Marx, 2018; Ramsey & Edwards, 2012; Thiel & Marx, 2019). To facilitate the SAE component, SBAE teachers often employ experiential learning as the pedagogical approach of instruction (Baker et al., 2012). Unfortunately, the ability for teachers to plan for and facilitate such experiences has been reported as lacking (Hanna, 1992). Furthermore, when we consider middle school SBAE programs, the ability to offer a comprehensive program is vastly different than that of a high school program (Talbert et al., 2013). While SAE has continually evolved (Smith & Rayfield, 2016), more recent high school projects have focused on agricultural literacy, career exploration, financial management, and service learning (The Council, 2017).

As a part of middle school Career and Technical Education (CTE), SBAE provides opportunities for skill development and career exploration (Ireland, 2022). Nationwide, many middle school CTE programs have integrated science, technology, engineering, and math (STEM) to engage students (Godbey & Gordon, 2019). Middle school has also become a preparation point for careers and high school success, of which attendance, grades, and engagement become predictors of high school completion (Balfanze, 2009; Godbey & Gordon, 2019; Hoff et al., 2015). As states utilize Perkins V funds to expand CTE programs, the number of middle grades SBAE programs will only increase (Hanover Research, 2020).

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The National Council for Agricultural Education's (NCAE) summit began a process of reinvigorating SAE by identifying the driving forces behind high-quality experiential work and projects based on a trend of decreasing numbers of students engaged through various measurable outcomes (NCAE, 2012). An outcome of the summit was a national committee charged with focusing the profession's commitment to SAE. This work led to a renewed philosophy and guiding principles of SAE to address barriers and created a goal of 100% SAE participation. Curriculum, resources, and learning guides were developed for secondary agricultural teachers but failed to address unique needs of middle school programs (NCAE, 2012). If SAE projects are intended for every student enrolled in SBAE, including those in middle school, and if middle schools are considered a preparatory vehicle for high school success and future careers, then SAE within middle school SBAE warrants further research and discussion among the profession. Consideration of SAE integration within middle school SBAE programs is essential to determine the necessary components of a competent middle school SBAE teacher (Hainline & Smalley, 2021).

Theoretical/Conceptual Framework

Research in the field of education for several decades has been based on theories more commonly used in economic fields to justify expenses (Holden & Biddle, 2017). During the later 1950's human capital began to be used as an academic program to support public spending in education as a form of investment (Ross, 2021). The idea was that public investment in education provided a high rate of return on spending and the accomplishment of shared goals, such as faster economic growth and poverty reduction (Holden & Biddle, 2017). As a public investment, investing in education improves economic growth through higher productivity, which is achieved through individual social stability and healthier lifestyles (Maringe, 2015). Today, policymakers globally generally accept the premise that investment in education is a good thing as a means to provide economic growth and national prosperity (Carneiro et al., 2010).

While government leaders and policymakers focus on the overall growth and welfare of the nation, outputs are often measured, such as increased lifetime earnings, access to higher-income careers, reduced unemployment, and increased career growth (Maringe, 2015). From the employer's perspective, human capital is a renewable resource (Ross, 2021), as they cultivate productivity as a potential source of innovation and creativity. In CTE, McCall et al. (2016) states that an individual will obtain training "when the present discounted value of the benefits of training exceeds the cost of the training" (p. 479). An individual is more likely to invest in training if the returns or increased earnings are more significant than the training.

In the U.S. agricultural industry, employment fell in the proportion of total employment from 33% in 1910 to roughly 2% in 2017 (Wang et al., 2017). During this same period, total farm output tripled, and total labor use declined nearly 80 percent, implying that output per worker grew (Wang et al., 2017). The educational attainment of farmworkers and operators has changed dramatically, as nearly three-quarters of farm workers in 1950 received less than nine years of education, compared to only 17% in 2017. In comparison, in 1950, only 4% of farm workers and operators completed some college, compared to nearly 40% in 2017 (Wang et al., 2017). At the intersection of education, agriculture, and industry needs, SBAE must capitalize on extensions of the human capital theory to conceptualize the work performed in SAE in the middle grade levels that can be measured and understood. As human capital focuses on the education, skills, training, and experiences essential for a chosen career (Little, 2003; Schultz, 1971), the need to consider the perceptions, barriers, and implementation of SAE at the middle school level is essential.

Purpose of the Study

The purpose of this study was to identify the current perceptions, barriers, and implementation of current middle school SAEs in the Southeast United States (i.e., Alabama, Florida, Georgia, North Carolina, and South Carolina). Three research objectives guided this study:

1. Determine the perceptions of integrating SAE into middle school SBAE programs,
2. Identify current barriers of middle school SAE integration for all students, and
3. Establish best practices for middle school SAE implementation.

Methods and Procedures

This study employed a modified Delphi approach to reach consensus on the perceptions, barriers, and implementation of middle school SAEs from a panel of experts (Dalkey, 1969). Specifically, the panel of experts consisted of in-service middle school SBAE teachers in five states with long-standing middle school programs. Determining the proper panel of experts can be challenging, but is essential for a successful Delphi (Dalkey, 1969). This panel was deemed experts as they have been considered to have the necessary skill set and work experience (Benner, 1982) as current middle school SBAE teachers. Furthermore, this selection aligns with the human capital theory grounding this study, as these experts were hired as competent middle school SBAE teachers by school districts, indicating they have the necessary human capital to be effective in their chosen career, allowing the research team to deem them experts. Additionally, responses from each round were compared between states, gender, certification pathway, and years of teaching experience to ensure the validity and reliability of the items developed. Therefore, the participating teachers were deemed as appropriate "experts" within middle school SBAE.

Qualtrics, an online data survey data collection tool, was used for all three rounds. The recommendations of Dillman et al. (2014) were followed to ensure compatibility of each round through electronic survey development, mobile device compatibility, and participation emails. Additionally, each round was evaluated for face and content validity by a panel of agricultural education teacher preparation faculty with an excess of 30 years of experience between the middle school, secondary, and post-secondary levels. The Qualtrics link was distributed to a researcher developed distribution frame which included all current middle school SBAE teachers in Alabama, Florida, Georgia, North Carolina, and South Carolina ($N = 401$). After the initial recruitment email was sent, three reminders were sent in one-week intervals for each of the Delphi rounds, per Dillman et al. (2014) to maximize response rate.

To ensure reliability of data collection, the researchers worked to minimize attrition between rounds, maintaining integrity. This process aligns with Dalkey (1969) who stated the ability to maintain a reliability of 0.8 or greater when a Delphi has more than 13 respondents in each round. Although the minimal response rate from the target population could be deemed a concern, the participants were representative of the population and the minimum number of respondents (i.e., 13 or more) was achieved with minimal attrition between rounds (Dalkey, 1969). Furthermore, Dalkey (1969) identified diminishing returns on the effect of group size and the reliability of the research in relation to group size for more than 13 participants, as the average group error falls below 0.5 and the reliability estimate in above 0.8.

The expert panel ($n = 34$) spanned five states (i.e., four from Alabama, five from Florida, 14 from Georgia, eight from North Carolina, and three from South Carolina, was 70% female, ranged in age from 21 to 55, and included first year teachers to those with over 25 years of experience. The experts were primarily traditionally certified (70%) with programs ranging from 50 students to over 350 students. Although the question could be raised about the qualification of "experts" within this study, the research team deemed current middle school SBAE teachers to be the most knowledgeable individuals when it comes to the current implementation of SAE in middle school SBAE programs. The diversity amongst panelists (i.e., age, state, sex, certification pathway, and years of teaching experience) aligns with regional personal and professional characteristics (Foster et al., 2023) and provides varying views on the topic at hand which were then combined to reach a statistical group response through the Delphi method (Dalkey, 1969). Additionally, SBAE teachers have been found to be effective across the complete SBAE program regardless of age, sex, years of teaching experience, certification pathway, highest degree earned, program size, or tenure in their current position (Eck et al., 2021).

For Round One, the researchers asked three open-ended questions, *what is your perception of integrating SAE into your middle school agricultural education program?; what are the barriers for integrating SAE into your middle school agricultural education program?*; and *what are the best practices for integrating SAEs into middle school agricultural education programs?* In addition to the three overarching questions, personal and professional characteristic questions were asked. The items from each of the three questions were analyzed by the research team using the constant comparative method (Glaser & Strauss, 1967) to reduce statements that were duplicative to be distributed to the experts in Round Two. Using this method allowed the researchers to group similar items while focusing on the expert's voice (Glaser & Strauss, 1967). To ensure inter-rater reliability throughout this process, the research team collectively analyzed the statements (Privitera, 2017). Round Two asked the experts to rate each item on a four-point scale of agreement (1 = Strongly Disagree; 2 = Disagree; 3 = Agree; 4 = Strongly Agree). An a priori consensus rating was established for Round Two, therefore, if an item achieved a mean of 3.0 or higher with 100% agreement from the experts, the item was retained for the final list.

Any items not reaching consensus in Round Two were redistributed in Round Three, asking experts to *agree* or *disagree*. Any item an expert disagreed with prompted a request for an explanation on why they disagreed. Round Three ultimately provides experts a final opportunity to reflect and provide clarification for any of the remaining items (Hsu & Sanford, 2007). Final consensus of remaining items was set at an 85% a priori level of agreement, meaning 85% of the experts *agreed* with the item in Round Three. The three procedural rounds within this Delphi study were appropriate and typical to achieve consensus (Custer et al., 1999).

Findings

Round One aimed to compile a comprehensive list of items from the three open-ended questions. Round One resulted in responses from 34 experts. Minimal attrition occurred between Round One and Round Two, as Round Two resulted in responses from 33 of the 34 experts. Any items not reaching consensus in Round Two were redistributed to the experts in Round Three. Twenty-eight experts responded in Round Three, resulting in some attrition between Rounds Two and Three, but not enough to impact reliability concerns within the expert panel (Dalkey, 1969).

Research Objective 1: Determine the perceptions of integrating SAE into middle school SBAE programs

Round One elicited responses to one overarching question, *what is your perception of integrating SAE into your middle school agricultural education program?* Round One resulted in 30 statements which included a variety of detailed statements. The 30 initial statements were compiled to develop a comprehensive list of 18 items that were distributed in Round Two. Round Two asked experts to rate each item on a four-point scale of agreement. Table 1 outlines the mean, standard deviation, and percentage of agreement for each of the 18 items.

Table 1

Round Two: Level of Agreement for Perceptions of Middle School SAE Integration (n = 33)

Identified Item	*M*	*SD*	*%Agreement*[a]
Supporting the three-component model	3.70	.47	100.0
Providing personal growth opportunities for students	3.69	.47	97.0
Teaches responsibility	3.65	.49	97.0
Developing real life experiences for students	3.59	.57	97.0
Providing hands-on experiences for students	3.56	.51	100

Teaching students to maintain records	3.52	.58	97.0
Helping students set goals	3.48	.58	97.0
Building on classroom content knowledge	3.44	.58	97.0
Building a foundation for high school involvement	3.41	.64	93.9
Stimulating student interest in agriculture	3.37	.57	90.9
Presenting agricultural opportunities for students	3.37	.57	90.9
Getting students involved	3.33	.48	100
Promoting program success	3.33	.56	90.9
Developing career experiences for students	3.32	.63	87.9
Aligning with content standards	3.15	.72	84.8
Teaching Science	3.15	.77	81.8
Providing opportunities for FFA advancement, degrees, and awards	3.15	.72	84.8
Teaching the scientific method	2.89	.70	75.6

Note. 1= Strongly Disagree, 2= Disagree, 3= Agree, 4 = Strongly Agree; [a] = items marked as either a 3 or a 4.

Items achieving a mean score of 3.0 or higher and 100% agreement amongst the panelist were determined to meet consensus in Round Two. Of which, three items achieved consensus, *supporting the three-component model*, *providing hands-on experiences for students*, and *getting students involved*. The remaining 15 items were redistributed in Round Three, all of which reached consensus, achieving a percentage agreement at 89.2% or above (see Table 2).

Table 2

Round Three: Level of Agreement for Perceptions of Middle School SAE Integration (n = 28)

Identified Item	*Agree*	*Disagree*	*%Agreement*[a]
Developing real life experiences for students	28	0	100.0
Building on classroom content knowledge	28	0	100.0
Providing personal growth opportunities for students	27	1	96.4
Teaches responsibility	27	1	96.4
Teaching students to maintain records	27	1	96.4
Helping students set goals	27	1	96.4
Stimulating student interest in agriculture	27	1	96.4
Presenting agricultural opportunities for students	27	1	96.4
Developing career experiences for students	27	1	96.4
Aligning with content standards	27	1	96.4
Teaching Science	27	1	96.4
Providing opportunities for FFA advancement, degrees, and awards	26	2	92.8
Teaching the scientific method	26	2	92.8
Building a foundation for high school involvement	25	3	89.2
Promoting program success	25	3	89.2

Note. An a priori of 85% was set by the researchers to retain items in Round Three.

Research Objective 2: Identify current barriers of middle school SAE integration for all students.

The second research objective aimed to answer one overarching question, *what are the barriers for integrating SAE into your middle school agricultural education program?* Round One resulted in 68

statements. Thirty-Seven statements were distributed in Round Two after the research team analyzed the statements from Round One. Round Two asked experts to rate each item on a four-point scale of agreement. Table 3 outlines the mean, standard deviation, and percentage of agreement for each of the 37 items.

Table 3

Round Two: Level of Agreement for Barriers of Middle School SAE Integration (n = 33)

Identified Item	*M*	*SD*	*%Agreement*[a]
Teaching in a single teacher program	3.50	.76	93.9
Overwhelming teacher responsibility	3.46	.65	93.9
Student transportation	3.38	.75	87.9
Competition for student time	3.27	.72	87.9
Student financial limitations	3.23	.65	90.9
A lack of student motivation	3.23	.65	90.9
Limited accessibility to production agriculture	3.19	.63	90.9
Student maturity	3.19	.63	90.9
Student living situations	3.19	.75	84.8
Agriculture being an elective course	3.19	.69	87.9
Student SAE knowledge	3.12	.53	93.9
Student apathy	3.12	.67	87.9
Student lack of planning	3.08	.64	42..4
Teacher stress	3.08	.74	81.8
Students' willingness to accept responsibility	3.04	.77	78.8
A lack of resources	3.00	.69	87.9
Teaching in a Title I or low economic school	2.96	.82	78.8
A lack of student buy-in	2.96	.77	75.8
School schedules (9-week vs. semester vs. year-long)	2.92	.85	69.7
Limited age-appropriate resources	2.92	.69	78.8
Program funding	2.92	.80	72.7
A lack of student interest in agriculture	2.88	.77	72.7
A lack of family support	2.85	.61	78.8
Class size	2.85	.97	69.7
A limited scope of SAE options (i.e., SAE = Livestock)	2.73	.96	63.6
A lack of teacher knowledge related to SAE.	2.69	1.0	69.7
Being a new teacher	2.65	.98	69.7
A lack of necessary student skills	2.65	.75	66.7
A lack of class time to spend on SAE	2.62	.70	66.7
Limited SAE project options	2.62	.75	63.6
Teaching in urban schools	2.58	.90	63.6
Being a new Middle School Agriculture program.	2.58	.95	66.7
Language barriers	2.50	.91	51.5
A lack of administrative support	2.36	.95	57.6
A lack of alignment to Industry Certifications	2.27	.83	42.4
SAE not being tied to curriculum	2.23	.86	48.5
Child labor laws	2.12	.82	39.4

Note. 1= Strongly Disagree, 2= Disagree, 3= Agree, 4 = Strongly Agree; [a] = items marked as either a 3 or a 4.

No items related to barriers of middle school SAE implementation met consensus in Round Two (i.e., achieved a mean score of 3.0 or higher and 100%), therefore, 37 items were redistributed in Round Three. Table 4 identifies the items for which experts were asked to agree or disagree. Of those, 19 items reached consensus, achieving an 85% or higher level of agreement.

Table 4

Round Three: Level of Agreement for Barriers of Middle School SAE Integration (n = 28)

Identified Item	*Agree*	*Disagree*	*%Agreement*[a]
A lack of student motivation	28	0	100
Student transportation	27	1	96.4
Student financial limitations	27	1	96.4
Student maturity	27	1	96.4
Student lack of planning	27	1	96.4
Overwhelming teacher responsibility	26	2	92.8
Competition for student time	26	2	92.8
Student living situations	26	2	92.8
Agriculture being an elective course	26	2	92.8
Teacher stress	26	2	92.8
Students' willingness to accept responsibility	26	2	92.8
Teaching in a single teacher program	25	3	89.2
Student apathy	25	3	89.2
A lack of resources	25	3	89.2
Student SAE knowledge	24	4	85.7
Program funding	24	4	85.7
A lack of family support	24	4	85.7
A lack of necessary student skills	24	4	85.7
A lack of class time to spend on SAE	24	4	85.7
Teaching in a Title I or low economic school	23	5	82.1
A lack of student interest in agriculture	23	5	82.1
A lack of student buy-in	22	6	78.6
Limited age-appropriate resources	22	6	78.6
Language barriers	22	6	78.6
Limited accessibility to production agriculture	21	7	75.0
Class size	21	7	75.0
Being a new teacher	21	7	75.0
Limited SAE project options	21	7	75.0
Being a new Middle School Agriculture program	21	7	75.0
A lack of administrative support	21	7	75.0
School schedules (9-week vs. semester vs. year-long)	19	9	67.9
A limited scope of SAE options (i.e., SAE = Livestock)	18	10	64.3
A lack of alignment to Industry Certifications.	18	10	64.3
Child labor laws	18	10	64.3
A lack of teacher knowledge related to SAE	17	11	60.7
Teaching in urban schools	17	11	60.7
SAE not being tied to curriculum	16	12	57.1

Note. An a priori of 85% was set by the researchers to retain items in Round Three.

When asked to explain why they disagreed with items not reaching consensus, as the collective response indicated that the items were not widespread barriers, with statements such as, "they are not problems where I teach", "SAE's are not limited in scope", "SAE's do not have to relate to production agriculture", or "these barriers can be overcome by utilizing available resources".

Research Objective 3: Establish best practices for middle school SAE implementation Round One resulted in 62 initial statements, which were reduced to 25 items distributed to the panel of experts in Round Two. Table 5 outlines the mean, standard deviation, and percentage of agreement for each of the 37 items.

Table 5

Round Two: Level of Agreement for Best Practices in Middle School SAE Integration (n = 33)

Identified Item	*M*	*SD*	*%Agreement*
Dedicating class time for SAE implementation	3.52	.51	100
Aligning your program with the three-component model of agricultural education.	3.46	.71	90.9
Utilizing existing school facilities (i.e., land lab, greenhouse, shop, garden, etc.)	3.44	.75	87.9
Starting with Foundational SAEs	3.37	.63	93.9
Teaching students accurate record keeping	3.33	.62	93.9
Parent/family support	3.30	.61	93.9
Dedicating class time to teach SAEs	3.30	.78	90.9
Using SAE to teach soft skills	3.30	.61	93.9
Community support	3.26	.65	90.9
Developing student buy-in	3.26	.59	93.9
Connecting existing student projects to SAE areas	3.22	.64	90.9
Community service and/or volunteer projects	3.19	.56	93.9
SAE as part of your class grade	3.19	.79	87.9
Developing community relevant SAE projects	3.15	.72	84.8
Establishing support from school administration	3.15	.82	78.8
Requiring SAE for all students as part of your class	3.15	.82	84.8
Introducing students to AgExplorer	3.12	.67	87.9
Weekly project check-ins	3.04	.66	84.8
Optimizing school-based enterprises	2.93	.68	78.8
Connecting SAEs to FFA degrees and awards	2.93	.68	78.8
Implementation of immersive SAEs	2.89	.70	81.8
Requiring students to invest a set number of hours for SAEs	2.88	.77	72.7
Connecting SAEs to science fair projects	2.74	.76	69.7
Creating student vision boards	2.67	.68	63.6
AET implementation for record keeping	2.59	.93	60.6

Note. 1= Strongly Disagree, 2= Disagree, 3= Agree, 4 = Strongly Agree; [a] = items marked as either a 3 or a 4.

One item (*Dedicating class time for SAE implementation*) met consensus in Round Two, the remaining 24 items were redistributed to the experts for Round Three. Twenty one of the 24 items achieved consensus in Round Three. The items not reaching consensus amongst the experts were removed from the final list (see Table 6).

Table 6

Round Three: Level of Agreement for Best Practices in Middle School SAE Integration (n = 28)

Identified Item	*Agree*	*Disagree*	*%Agreement*
Starting with Foundational SAEs	28	0	100
Dedicating class time to teach SAEs	28	0	100
Using SAE to teach soft skills	28	0	100
Utilizing existing school facilities (i.e., land lab, greenhouse, shop, garden, etc.)	27	1	96.4
Teaching students accurate record keeping	27	1	96.4
Developing student buy-in	27	1	96.4
Connecting existing student projects to SAE areas	27	1	96.4
SAE as part of your class grade	27	1	96.4
Developing community relevant SAE projects	27	1	96.4
Establishing support from school administration	27	1	96.4
Requiring SAE for all students as part of your class	27	1	96.4
Community support	26	2	92.8
Community service and/or volunteer projects	26	2	92.8
Optimizing school-based enterprises	26	2	92.8
Aligning your program with the three-component model of agricultural education	25	3	89.2
Parent/family support	25	3	89.2
Introducing students to AgExplorer	25	3	89.2
Connecting SAEs to FFA degrees and awards	25	3	89.2
Implementation of immersive SAEs	24	4	85.7
Requiring students to invest a set number of hours for SAEs	24	4	85.7
Connecting SAEs to science fair projects	24	4	85.7
Weekly project check-ins	23	5	82.1
Creating student vision boards	22	6	78.6
AET implementation for record keeping	21	7	75.0

Note. An a priori of 85% was set by the researchers to retain items in Round Three.

Experts indicated disagreement with items as they “are not necessary” or “increase the level of stress and anxiety of students”. AET implementation for record keeping resulted in feedback that “other recording keeping resources exist” and “I have had more success with record keeping outside of AET”. Table 7 categorizes the items achieving consensus within the three procedural rounds of the Delphi (Dalkey, 1969).

Table 7

Categorized Items for Middle School SAE Integration

Category	Identified Item
Perceptions	Supporting the three-component model
	Providing hands-on experiences for students
	Getting students involved
	Developing real life experiences for students
	Building on classroom content knowledge
	Providing personal growth opportunities for students
	Teaches responsibility

	Teaching students to maintain records
	Helping students set goals
	Stimulating student interest in agriculture
	Presenting agricultural opportunities for students
	Developing career experiences for students
	Aligning with content standards
	Teaching Science
	Providing opportunities for FFA advancement, degrees, and awards
	Teaching the scientific method
	Building a foundation for high school involvement
	Promoting program success
Barriers	A lack of student motivation
	Student transportation
	Student financial limitations
	Student maturity
	Student lack of planning
	Overwhelming teacher responsibility
	Competition for student time
	Student living situations
	Agriculture being an elective course
	Teacher stress
	Students' willingness to accept responsibility
	Teaching in a single teacher program
	Student apathy
	A lack of resources
	Student SAE knowledge
	Program funding
	A lack of family support
	A lack of necessary student skills
	A lack of class time to spend on SAE
Best Practices	Dedicating class time for SAE implementation
	Starting with Foundational SAEs
	Dedicating class time to teach SAEs
	Using SAE to teach soft skills
	Utilizing existing school facilities (i.e., land lab, greenhouse, shop, garden, etc.)
	Teaching students accurate record keeping
	Developing student buy-in
	Connecting existing student projects to SAE areas
	SAE as part of your class grade
	Developing community relevant SAE projects
	Establishing support from school administration
	Requiring SAE for all students as part of your class
	Community support
	Community service and/or volunteer projects
	Optimizing school-based enterprises
	Aligning your program with the three-component model of agricultural education
	Parent/family support

Introducing students to AgExplorer
Connecting SAEs to FFA degrees and awards
Implementation of immersive SAEs
Requiring students to invest a set number of hours for SAEs
Connecting SAEs to science fair projects

Conclusions, Implications, and Recommendations

This study aimed to determine the perceptions, barriers, and best practices for integrating SAE into middle school SBAE programs, as identified by an expert panel of Middle School SBAE teachers in Alabama, Florida, Georgia, North Carolina, and South Carolina. After three rounds, 18 items achieved consensus related to perceptions of Middle School SAE integration, 19 items outlining barriers for Middle School SAE implementation, and 22 items indicating best practices for Middle School SAE integration. Overall, middle school SBAE teachers reached consensus on 18 items related to the value or perception of SAE integration. Of which, a positive perception is held overall with SAE providing a value add to the middle school students. This aligns with previous research identifying SAE as an integral component of SBAE programs (Rubenstein et al., 2014), helping students increase their employability skills and furthering their content knowledge (Ramsey & Edwards, 2012; Thiel & Marx, 2019).

By reviewing the list of barriers, it is apparent that strategies to address SAE in middle school agricultural education courses must address meeting the students where they are in terms of age, maturity, and exposure. Ultimately this connects back to their human capital (i.e., education, skills, training, and experiences) essential for future careers (Little, 2003; Schultz, 1971). Therefore, the development of curriculum and middle school specific implementation strategies for SAE that provide more of an exploratory experience is essential, allowing students to see the potential in the educational investment (Ross, 2021). Furthermore, the human capital of middle school SBAE teachers should be considered, helping to improve economic growth in educational opportunities for middle school students through higher productivity, social stability, and healthier lifestyles for SBAE teachers (Maringe, 2015). This becomes increasingly important as the findings of this study identify middle school teachers juggling as many if not more aspects of the complete SBAE model as compared to their high school counterparts. In addition, they described working with substantially more students, as over 60% of the respondent's reported more than 100 students in single teacher programs. Perhaps it is time to consider a middle school specific SAE for all.

With 22 items focusing on SAE best practices, it is apparent that middle school SBAE teachers implement SAE on varying levels. This facilitation of SAE speaks to the need for teachers to be prepared to implement experiential learning as the pedagogical approach to instruction (Baker et al., 2012). Unfortunately, consistency of implementation is of concern, which aligns with the previously identified struggles for SBAE teachers to plan and facilitate SAE experiences (Hanna, 1992). Perhaps it is time to develop a middle school specific model for a complete agricultural education program, as the theoretical underpinnings of these programs are different and should be considered as the number of middle school programs continues to increase. When we consider the uniqueness of middle school SBAE programs (Talbert et al., 2013), the overall list of perceptions, barriers, and best practices is of great value for future implementation as additional programs are added (Hanover Research, 2020). To fully encompass the three-component model of agricultural education, particular focus should work to utilize the FFA student organization to enforce SAE achievement for middle school students. This begins with nationally recognized events and awards to further support middle school SBAE programs. Many of the states involved in this study have implemented state level awards and leadership/career development events to recognize middle grades students for their accomplishment, which is evident in the developed best practices.

Recommendations for practice begin with purposeful professional development opportunities specific for middle school SBAE teachers, focusing on the identified perceptions, barriers, and best practices. Professional development should be shared with teacher leaders, educators, state staff, and school administrators, as the identified list is extensive, and everyone has a shared role and vested interest. Potential topics include best management practices and coping strategies to address berries to SBAE middle grades SAE implementation. Additionally, nationally recognized events and awards are needed to further support middle school SBAE programs. SBAE teacher educators, middle school SBAE teachers, and state staff should work collectively on curriculum or guides for middle grade SAE implementation, as these guides must address varying program sizes and teaching schedules along with the large class sizes.

Since this study was limited to five southern states and responses from 34 middle school SBAE teachers, the replication of this study should be considered in states with middle school SBAE programs, although no differences were found between participating states. Additionally, the diversity of panelists (i.e., age, state, sex, certification pathway, and years of teaching experience) aligns with regional personal and professional characteristics (Foster et al., 2023) and provides varying views which reached consensus on middle school SAE integration, following the Delphi protocols outlined by Dalkey (1969). Based on the recommendations of Dalkey (1969), this study resulted in an acceptable group size (n = 28 to 34 depending on round), which can then be characterized has having minimal group error (< 0.5) and acceptable reliability (> 0.8). Therefore, the use of the complete list of perceptions, barriers, and implementation should be considered by stakeholders with middle school SBAE programs and teachers nationwide. The additional research in other states would help further develop this list as a guide for national implementation. Additionally, this study should be replicated periodically to assess teacher perceptions, current barriers, and implementation considering the constantly changing educational climate. To further the validity of this list, input from teacher educators, state staff, middle school students, and administrators should be investigated.

References

Baker, M. A., Robinson, J. S., & Kolb, D. A. (2012). Aligning Kolb's experiential learning theory with a comprehensive agricultural education model. *Journal of Agricultural Education, 53*(4), 1–16. https://doi.10.5032/jae.2012.04001

Balfanz, R. (2009). Putting middle grades students on the graduation path: A policy practice brief. *Everyone Graduates Center and Talent Development Middle Grades Program.* Johns Hopkins University.

Benner, P. (1982). From novice to expert. *American Journal of Nursing, 84*(12), 402–407. https://files.eric.ed.gov/fulltext/ED384695.pdf#page=130

Hanover Research. (2020). *Best Practices in Middle School Career and Technical Education Expansion*. https://portal.ct.gov/-/media/SDE/CTE/Best-Practices-in-Middle-School-Career-and-Technical-Education-Expansion.pdf

Carneiro, P., Dearden, L., & Vignoles, A. (2010) The Economics of Vocational Training. *International Encyclopedia of Education (3rd Ed.).* Elsevier.

Dalkey, N. C. (1969). *The Delphi method: An experimental study of group opinion.* The Rand Corporation.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method.* Wiley.

Eck, C. J., Robinson, J. S., Cole, K. L., Terry Jr., R., & Ramsey, J. W. (2021). Identifying the Characteristics of Effective School-Based Agricultural Education Teachers: A National Census Study. *Journal of Agricultural Education*, *62*(3), 292–309. https://doi.org/10.5032/jae.2021.03292

Foster, D. D., Smith, A. R., Lawver, R. G., & Spiess, M., (2023). National Agricultural Education Supply and Demand Project [data set]. *American Association for Agricultural Education*. http://aaae.agedweb.org/nsd.

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory*. Aldine.

Godbey, S., & Gordon, H. R. (2019). Career Exploration at the Middle School Level: Barriers and Opportunities. *Middle Grades Review, 5*(2). https://scholarworks.uvm.edu/mgreview/vol5/iss2/2

Haddad, B., & Marx, A. A. (2018). Student perceptions of soft skills & career decision self-efficacy through participation in SAE. *Journal of Agricultural Education, 59*(4), 159–176. https://doi.org/10.5032/jae.2018.04159

Hainline, M. S., & Smalley, S. W. (2021). Pre-Service teachers self-perceived training needs associated with program design and management and leadership and SAE development. *Journal of Agricultural Education, 62*(1), 227–245. https://doi.org/10.5032/jae.2021.01227

Hanna, G. (1992, October 8-11). *Jumping deadfall: Overcoming barriers to implementing outdoor and environmental education* [Paper presentation]. International Conference for the Association for Experiential Education, Banff, Alberta, Canada. https://files.eric.ed.gov/fulltext/ED353112.pdf

Hoff, N., Olson, A., & Peterson, R. L. (2015). *Dropout screening and early warning.* Topic Brief. Lincoln, NE: Student Engagement Project, University of Nebraska-Lincoln and the Nebraska Department of Education.

Holden L., & Biddle, J., (2017). The Introduction of Human Capital Theory into Education Policy in the United States. *History of Political Economy*,*49*(4), 537-574. https://doi.org/10.1215/00182702-4296305

Hsu, C. C., & Sanford, B. A. (2007). The Delphi technique: Making sense of consensus. *Practical Assessment, Research & Evaluation, 12*(10). https://pareonline.net/getvn.asp?v=12&n=10

Ireland, A. (2022). *The Importance of Middle and High School CTE Programs*. https://blog.edmentum.com/importance-middle-and-high-school-cte-programs

Little, J. W. (2003). Inside teacher community: Representations of classroom practice. *Teachers College Record, 105*(6), 913–945.

Maringe, F. (2015) Higher Education Market. *International Encyclopedia of Social and Behavioral Sciences*, *2*, 850–861. https://doi.org/10.1016/B978-0-08-097086-8.92118-4

McCall, B., Smith, J., & Wunsch, C. (2016) Government Sponsored Vocational Education for Adults. *Handbook of the Economics of Education, 5*, 479–652. https://www.sciencedirect.com/handbook/handbook-of-the-economics-of-education

National Council for Agricultural Education [NCAE]. (2012). *About agricultural education*. https://www.ffa.org/thecouncil/aboutus

Privitera, G. J. (2017). *Research methods for the behavioral sciences (2nd ed.).* Sage

Ramsey, J. W., & Edwards, M. C. (2012). Entry-level technical skills that teachers expected students to learn through Supervised Agricultural Experiences (SAEs): A modified Delphi study. *Journal of Agricultural Education, 53*(3), 42–55. https://doi.org/10.5032/jae.2012.03042

Ross, S. (2021). *What is the Human Capital Theory and How is it Used?* https://www.investopedia.com/ask/answers/032715/what-human-capital-and-how-it-used.asp

Rubenstein, E. D., Thoron, A. C., & Estepp, C. M. (2014). Perceived self-efficacy of preservice agriculture teachers toward specific SAE competencies. *Journal of Agricultural Education, 55*(4), 72–84. https://doi.org/10.5032/jae.2014.04072

Smith, K. L., & Rayfield, J. (2016). An early historical examination of the educational intent of Supervised Agricultural Experiences (SAEs) and project-based learning in agricultural education. *Journal of Agricultural Education, 57*(2), 146–160. https://doi.org/10.5032/jae.2016.02146

Talbert, B. A., Vaughn, R., Croom, D. B., & Lee, J. S. (2013). *Foundations of agricultural education (1st ed.).* Pearson.

The National Council for Agricultural Education (The Council). (2017). *SAE for all: Teacher edition*. https://ffa.app.box.com/s/exollg1x7q2lntun3su2mdufw07wiklf

Thiel, B. L., & Marx, A. A. (2019). The influence of agriscience research SAEs on perceived self-efficacy of 21st century skill attainment. *Journal of Agricultural Education, 60*(1), 80–95. https://doi.org/10.5032/jae.2019.01080

Wang, S. L., Hoppe, R. A., Hertz, T., & Xu, S. (2017). *Farm Labor, Human Capital, and Agricultural Productivity in the United States.* https://www.ers.usda.gov/webdocs/publications/103267/err-302.pdf?v=8829