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Understanding Barriers to SAE Implementation and Professional Development Needs of Middle School SBAE Teachers

Matthew J. Wood[1]
Jenny E. Bennett[2]

Abstract

This national descriptive study examined the barriers to Supervised Agricultural Experience (SAE) implementation and the professional development needs of middle school School-Based Agricultural Education (SBAE) teachers. Using Dillman's Tailored Design Method, an online survey was distributed via the NAAE listserv and completed by 381 teachers across 32 states. The instrument, developed through expert review and pilot testing, included items addressing perceived barriers, professional development priorities, and teacher demographics. Data were analyzed using descriptive statistics and the Borich (1980) Needs Assessment Model, with additional disaggregation by NAAE region to identify contextual differences. The most prominent barriers reported were students' lack of maturity, limited willingness to accept responsibility, financial constraints, insufficient instructional time, and inadequate administrative support. Teachers expressed the greatest professional development needs in teaching students how to use the AET system (MWDS = 7.77), explaining the importance and benefits of SAEs (MWDS = 7.56), and engaging students from diverse backgrounds (MWDS = 6.87). Grounded in Human Capital and Social Cognitive Theory, the findings emphasize that both structural investments (e.g., professional learning and mentoring) and psychological supports (e.g., self-efficacy and collaboration) are essential for strengthening teacher capacity and confidence. Results underscore the importance of scaffolded SAE models, targeted professional development, and mentorship structures in promoting equitable and developmentally appropriate SAE implementation in middle school SBAE programs.

Introduction

Supervised Agricultural Experiences (SAEs) are a cornerstone of School-Based Agricultural Education (SBAE), providing students with hands-on opportunities to apply classroom knowledge, develop career skills, and participate in meaningful work-based learning (National Council for Agricultural Education, 2015). As one of the three integral components of the SBAE model, alongside classroom instruction and FFA participation, SAEs bridge the gap between theory and practice by cultivating industry-relevant skills and interests (Bird et al., 2013; Croom, 2008). Research indicates that students involved in SAEs develop technical competencies and critical employability skills, such as leadership, responsibility, and time management, which are essential for workforce readiness (Price et al., 2023; Smith & Rayfield, 2016). Furthermore, students who participate in placement-type SAEs demonstrate higher levels of career decision self-efficacy compared to those without an SAE, suggesting that involvement in SAEs positively influences students' confidence in pursuing agricultural careers (Haddad & Marx, 2018).

Historically, SAEs were primarily focused on ownership and placement experiences within production agriculture. However, as agricultural education programs diversified and access to land,

[1]Matthew J. Wood is an Agriscience Educator in the Laurel School District, 1160 S. Central Avenue, Laurel, Delaware 19956, matthew.wood@laurel.k12.de.us. ORCID# 0000-0003-3974-2282
[2]Jenny E. Bennett is an Assistant Professor of Agricultural Education in the Department of Agricultural and Resource Economics at Colorado State University, 301 University Avenue, Fort Collins, Colorado 80523, jennifer.bennett@colostate.edu. ORCID# 0009-0002-1178-0834

resources, and community partnerships presented challenges, the traditional SAE model became increasingly inequitable for students from varied backgrounds (Blackburn & Ramsey, 2014; Moore, 2017; Norris et al., 2025; Swenson et al., 2021). These disparities prompted agricultural educators and policymakers to reconsider what constitutes meaningful experiential learning in modern SBAE contexts. In response, the *SAE for All* framework was introduced by the National Council for Agricultural Education to modernize and expand the accessibility of SAEs. This model redefines experiential learning in agriculture through five categories: Foundational, Placement/Internship, Ownership/Entrepreneurship, Research, and School-Based Enterprise. These categories ensure that every student, regardless of background, geography, or resources, has access to a high-quality SAE experience (National Council for Agricultural Education, 2017). Early studies indicate that this expanded framework also promotes inclusivity, reflection, and career exploration while maintaining the experiential integrity of the traditional SAE model (Hainline & Smalley, 2021; Ramsey & Edwards, 2012).

Expanding SAE Opportunities to Middle School Programs

Agricultural education has traditionally been centered in high schools, where students engage in all three components of the SBAE model. However, states are increasingly leveraging Perkins V funding to expand SBAE programs to the middle school level. Research suggests that early SAE integration offers substantial benefits, as exposure to experiential learning at a younger age supports both technical skill development and personal growth, including responsibility, curiosity, and confidence (Eck & Davis, 2024). Furthermore, introducing SAEs at the middle school level aligns with broader educational goals related to career exploration, workforce readiness, and student engagement, particularly among underrepresented and non-traditional populations (Hainline & Smalley, 2021; Ramsey & Edwards, 2012). The timing of this expansion is notable, as middle school represents a critical developmental period when students begin to explore emerging interests and consider educational and career pathways (Caskey & Anfara, 2007; Faulkner et al., 2006). This expansion provides a unique opportunity to integrate SAEs early in students' educational journeys, fostering awareness of agricultural careers and the transferable skills necessary for future success. Early exposure to experiential learning can shape long-term motivation, engagement, and identity development within agricultural pathways (Eck & Davis, 2024).

Despite the positive opportunities associated with expanding SBAE programs into middle schools, implementing SAEs—even within the updated *SAE for All* framework—remains a persistent challenge (Eck & Davis, 2024). Even at the high school level, teachers report difficulties sustaining SAEs due to limited time, administrative support, and competing instructional demands (Dyer & Osborne, 1995; Shoulders & Toland, 2017). Other studies reveal that teachers often struggle to integrate SAE opportunities, citing resource constraints and inconsistent expectations from administrators and communities (Hainline & Smalley, 2021; Lewis et al., 2012; Ramsey & Edwards, 2012). Research focused on middle school implementation further indicates that these challenges are compounded by developmental considerations, facility limitations, and reduced teacher preparation specific to experiential learning and SAE supervision (Doss & Rayfield, 2019; Rank & Retallick, 2017; Rubenstein et al., 2014).

Collectively, the literature highlights that teachers' success in implementing SAEs at both the middle and high school levels depends not only on structural factors (e.g., time, funding, facilities) but also on personal and environmental influences such as teacher self-efficacy, beliefs, and contextual supports (Hainline & Smalley, 2021; Ramsey & Edwards, 2012; Shoulders & Toland, 2017). These insights suggest that both psychological and structural factors shape teachers' ability to implement SAEs effectively—concepts that align with established theoretical perspectives such as Social Cognitive Theory and Human Capital Theory, which are described in detail in the following section.

As SBAE expands into younger grades, it is essential that each aspect of the three-component model is delivered effectively. Given the known limitations and challenges associated with SAE integration at the high school level, special consideration should be given to understanding how SAEs can be effectively designed and delivered to meet the unique needs of middle school contexts. However, national research examining the barriers to SAE implementation from the teacher's perspective at the middle school level remains sparse (Eck & Davis, 2024; Retallick & Martin, 2008). This study aims to fill this gap by investigating the challenges faced by middle school SBAE teachers in developing and implementing SAEs within their middle school programs. Using a descriptive approach, the study provides a foundational snapshot of current practices and barriers to implementation in this rapidly growing area of SBAE. Findings will inform targeted professional development and curriculum design efforts that strengthen the implementation of SAEs in SBAE programs, ensuring that *SAE for All* is a meaningful component of agricultural education at the middle school level.

Theoretical Framework

The successful expansion of SBAE programs, including the SAE component, requires a strong theoretical foundation. Two prominent frameworks—Human Capital Theory (HCT) and Social Cognitive Theory (SCT)—offer valuable perspectives for understanding the barriers to SAE implementation and guiding efforts to strengthen teacher capacity and motivation within agricultural education. Human Capital Theory emphasizes the importance of investing in teachers' knowledge, skills, and professional development to enhance instructional effectiveness and student outcomes (Becker, 1964). In parallel, Social Cognitive Theory emphasizes the role of self-efficacy—the belief in one's ability to perform specific tasks successfully—and the reciprocal interaction between individuals, their behaviors, and their environments in shaping engagement and success (Bandura, 1986; Bandura, 1997). Together, these frameworks provide a comprehensive lens for understanding how middle school SBAE teachers can be empowered to effectively and sustainably implement the *SAE for All* model.

Human Capital Theory

Human Capital Theory posits that investments in individuals' skills, knowledge, and experiences yield increased productivity and long-term benefits for individuals and society (Becker, 1964). Within agricultural education, this framework emphasizes the importance of robust teacher preparation and ongoing professional development to equip educators with the necessary competencies to deliver high-quality SAEs. For middle school SBAE teachers, such investments are particularly critical as they navigate unique challenges related to limited facilities, time, and student developmental readiness. Effective pre-service programs and targeted in-service professional development can strengthen teachers' technical expertise and pedagogical strategies for engaging younger learners in meaningful SAE experiences aligned with the *SAE for All* categories. Conversely, inadequate SAE-focused training or limited access to professional learning opportunities can hinder the successful implementation of SAEs (Ford & Lambert, 2025).

Prior research supports that intentional and structured supports are a way to enhance human capital. Addressing these gaps through the use of structured supports, such as mentoring programs, professional learning communities, and workshops focused on innovative SAE design, enhances educators' human capital and, consequently, their ability to provide equitable, accessible, and impactful SAE opportunities for all students (Hainline & Smalley, 2023; Toombs et al., 2022). These investments not only strengthen individual teacher capacity but also contribute to the overall quality and sustainability of agricultural education programs, creating a cycle of professional growth that benefits teachers, students, and communities alike (Belay et al., 2021; Eck et al., 2019).

Social Cognitive Theory

Social Cognitive Theory (Bandura, 1986) complements Human Capital Theory by emphasizing the psychological mechanisms that influence human behavior and motivation. Central to SCT is the concept of self-efficacy, which refers to an individual's belief in their ability to plan and execute actions necessary to achieve desired outcomes (Bandura, 1997). In the context of SAE implementation, teacher self-efficacy plays a pivotal role in determining whether educators persist through challenges, innovate within resource constraints, and create supportive environments for student success. Teachers who believe in their capability to manage and deliver SAEs are more likely to commit the time and effort necessary to ensure implementation fidelity and student engagement (Ford & Lambert, 2025; Toombs et al., 2022).

SCT also highlights how teachers can shape students' self-efficacy through modeling, encouragement, and the creation of supportive learning environments. When students experience success in their SAEs and receive positive reinforcement from teachers, peers, and through awards or recognition programs, their motivation and confidence increase, leading to greater engagement and learning (Bandura, 1986; Bandura, 1997). Thus, SCT not only explains teachers' persistence and adaptability but also accounts for the social dynamics that foster student growth and sustained participation in agricultural education.

Integration of Theories

Integrating Human Capital Theory and Social Cognitive Theory provides a multidimensional understanding of SAE implementation in middle school SBAE programs. Human Capital Theory emphasizes the structural investments—such as teacher education, professional development, and access to resources—necessary to equip educators with the knowledge and skills to deliver effective experiential learning. In contrast, Social Cognitive Theory explains the personal and environmental factors that influence teachers' motivation, persistence, and confidence in applying those skills. Together, these frameworks suggest that effective SAE implementation depends on what teachers know and what they believe they can do with that knowledge.

These theories also guided the development of the study's survey instrument. Constructs such as teacher self-efficacy, professional capital, and structural supports were incorporated to examine how internal (psychological) and external (organizational) factors shape SAE implementation. This integrated perspective emphasizes that investments in teacher learning and support systems must be complemented by efforts to build confidence and cultivate positive professional environments. When teachers are well-prepared and self-assured in their abilities, they are more likely to design and sustain meaningful SAE opportunities for students. The synergy between these frameworks underscores the dual importance of structural investment (professional growth, resources) and psychological support (self-efficacy, support) in achieving successful and sustainable SAE implementation within middle school SBAE programs.

Purpose and Objectives

This study aimed to identify the barriers that middle school SBAE teachers across the United States encounter when implementing or attempting to implement SAEs. While previous studies have extensively examined SAE implementation at the high school level, national research exploring SAE implementation in middle school contexts remains limited. This study responds to calls in the literature to investigate how barriers impact SAE implementation. By examining barriers and professional development needs, this research extends prior work. It offers new insights grounded in Human Capital Theory and Social Cognitive Theory that can inform both an understanding of the current challenges and actionable strategies to improve SAE programming within middle school agricultural education. This research aligns with the value statements of the American Association for Agricultural Education (AAAE, 2023). First, it supports the first

value statement on advancing public knowledge of Agricultural, Food, and Natural Resource (AFNR) systems, emphasizing the importance of equipping teachers with the knowledge and tools—such as professional development—to implement SAEs effectively (p. 8). When teachers are confident and prepared to facilitate SAEs, they not only enhance student learning but also extend awareness to parents, administrators, and the broader community This research also supports the third value statement, which focuses on ensuring diversity, equity, inclusion, and belonging (p. 10). By identifying the barriers middle school agriculture teachers face in implementing SAEs and providing them with the professional support needed to overcome those challenges, educators can better engage all students, including those from underrepresented or non-traditional backgrounds, in meaningful, inclusive agricultural experiences envisioned by *SAE for All*. Finally, this work supports the seventh value statement by nurturing positive youth development through AFNR systems (p. 15). SAEs provide students with opportunities to explore various career pathways, develop technical and soft skills, and build personal responsibility through experiential learning, key outcomes that contribute to well-rounded youth development.

To examine how these outcomes can be supported at the middle school level, the following research objectives guided this study:

1. Describe the sample of middle school SBAE teachers.
2. Describe the current barriers among middle school SBAE teachers related to SAE implementation.
3. Describe the professional development needs of middle school SBAE teachers related to SAE implementation and AET usage.

Methodology

Research Design

This study employed a descriptive, cross-sectional survey design. The purpose of this design was to capture a national snapshot of middle school SBAE teachers' perceived barriers to implementing SAEs within contemporary models, such as *SAE for All*, and to identify their priorities for professional development. A survey approach was selected because it enabled the researchers to efficiently collect standardized data from a geographically dispersed teacher population, while providing the breadth necessary to describe trends and patterns. Rather than establishing causality, this design focused on documenting the current state of practice to inform future support for middle school SBAE teachers.

Participants

The target population for this study consisted of middle school SBAE teachers who were actively teaching during the 2023–2024 academic year. Based on estimates from the National FFA Organization (2002) and Foster et al. (2023), approximately 2,613 teachers met this criterion nationwide. A non-probability sampling approach was employed, using convenience sampling through the National Association of Agricultural Educators (NAAE) email listserv. Given the absence of a comprehensive database specific to middle school SBAE teachers, the NAAE listserv was deemed the most practical method for reaching a large and diverse population. Eligibility required that respondents be (1) active members of the NAAE listserv and (2) currently teaching at least one middle school agriculture course. While this sampling method limits generalizability, it enabled efficient recruitment from across the United States.

Sample size requirements were calculated using Cochran's (1977) formula, which indicated a minimum of 335 responses at a 95% confidence level with a ±5% margin of error. At the close of data

collection, 381 usable responses had been received, exceeding the minimum threshold and providing a sufficient basis for descriptive analysis and needs assessment. In total, 424 responses were submitted; however, responses were screened for eligibility and completeness. Only participants currently teaching at least one middle school agriculture course during the 2023-2024 academic year and who provided sufficient data for analysis were retained, resulting in a final sample of 381.

Instrumentation

The survey instrument was divided into three primary sections: perceived barriers, professional development needs, and teacher demographics.

The first section included 18 items adapted from previous studies by Eck and Davis (2024) and Price et al. (2023), which measured both student-related and teacher-related barriers. These barriers included issues such as student maturity, instructional time constraints, and administrative support. Items were rated on a 5-point Likert-type scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). The items were designed to measure the perceived barriers to SAE implementation and were created to reflect the multifaceted nature of these obstacles at the middle school level.

The second section of the instrument assessed professional development needs using the Borich (1980) Needs Assessment Model. This section consisted of six key topic areas related to SAE instruction: (1) identifying curriculum resources related to SAEs, (2) creating lessons on the importance of SAEs, (3) teaching students how to use the AET system, (4) engaging students in SAEs, (5) supervising student SAE projects, and (6) engaging parents, administrators, and community stakeholders in SAEs. Participants rated each topic on two 5-point Likert-type scales: one for perceived importance (1 = "Very Low," 5 = "Very High") and one for perceived ability (1 = "Very Low," 5 = "Very High"). These ratings were later used to calculate Mean Weighted Discrepancy Scores (MWDS) to identify professional development priorities.

The third and final section included items developed by the researchers to collect teacher and program demographics. These items collected information such as years of teaching experience, age, state of employment, certification pathway, and the number of students taught.

Content and face validity were established through expert review. A panel of agricultural education faculty and graduate students, with expertise in SAE research, survey development, and middle school pedagogy, reviewed the instrument for clarity, content alignment, and relevance to the research objectives. Some survey items were adapted from previously validated instruments. In contrast, others, particularly those related to professional development, were newly developed to better reflect the unique contexts of middle school agricultural education.

Pilot Testing

Before distribution, the instrument was pilot tested with 42 SBAE teachers in three states. Participants were asked to complete the survey and provide open-ended feedback on clarity, question wording, and online functionality. Revisions were made based on their input, including refinements to terminology, adjustments to scale anchors for consistency, and layout modifications to improve usability within Qualtrics.

Data Collection

The finalized survey was administered online via Qualtrics in May 2024. The survey link was distributed via three contact points following Dillman's (2014) Tailored Design Method. The initial email invited eligible teachers to participate in the study, described its purpose and procedures, and included a

link to an anonymous survey. A follow-up reminder email was sent approximately seven days later to increase response rates and thank those who had already completed the survey. A final reminder was distributed 14 days after the initial email. Each message emphasized the voluntary and confidential nature of the study.

Reliability

Reliability was assessed by examining the internal consistency of two key components of the instrument: perceived barriers (Objective 2) and professional development needs (Objective 3). Reliability was assessed using Cronbach's alpha. Barriers ($\alpha = .78$), Importance ($\alpha = .87$), and Ability ($\alpha = .83$) exceeded the alpha of .70 recommended by Nunnally & Bernstein (1994), indicating acceptable internal consistency and reliability for all three constructs.

Data Analysis

Data were analyzed using IBM SPSS Statistics (Version 29). For Objective 1, descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize teacher demographic characteristics and contextual variables. For Objective 2, participants' perceived barriers to SAE implementation were described using descriptive statistics, including means and standard deviations for each of the 18 barrier items.

To address Objective 3, the Borich (1980) Needs Assessment Model was employed. For each professional development topic, the mean importance and mean ability scores were used to calculate a Mean Weighted Discrepancy Score (MWDS). Scores for each topic were calculated by subtracting the mean ability score from the mean importance score and then multiplying the difference by the mean importance score. This calculation produces a prioritized list of topics based on the greatest gaps between perceived importance and ability, with larger MWDS values indicating greater discrepancies and, therefore, a higher need for professional development in those areas.

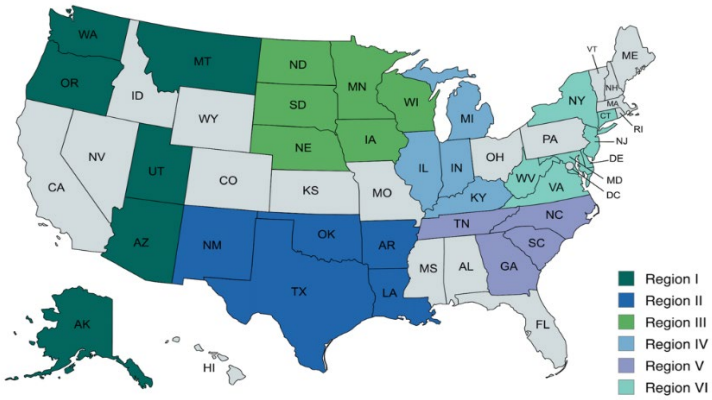
In addition to national-level analyses, data for Objectives 2 and 3 were disaggregated and examined by the six NAAE regions to identify regional trends and contextual differences in teachers' perceptions. This regional analysis allowed for comparisons across geographic areas, providing additional insight into how contextual factors influence barriers and professional development needs.

Results

Three hundred eighty-one individuals participated in the study, representing thirty-two states (Figure 1).

Figure 1

Teacher Participation by State and NAAE Region



Research Objective One

Among the educators surveyed, 43.6% (n = 166) identified themselves as male, 55.6% (n = 212) as female, and 0.8% (n = 3) preferred not to disclose their gender. Teachers' ages ranged from 21 to 76 years (M = 37.5, SD = 12.4), and their teaching experience varied from 1 to 42 years (M = 11.2, SD = 9.4). The surveyed teachers represented thirty-two states, with Georgia, Virginia, and North Carolina having the highest participation rates among the surveyed educators (Table 1).

Table 1

Participation by State (N = 381)

State	Participation Rate	
	f	%
Alaska	2	0.5
Arizona	3	0.8
Arkansas	3	0.8
Connecticut	2	0.5
Delaware	15	3.9
Georgia	53	13.9
Illinois	16	4.2
Indiana	30	7.9
Iowa	7	1.8
Kentucky	10	2.6
Louisiana	1	0.3
Maryland	2	0.5
Michigan	1	0.3
Minnesota	3	0.8
Montana	5	1.3
Nebraska	14	3.7
New Jersey	3	0.8
New Mexico	6	1.6
New York	24	6.3
North Carolina	32	8.4

State	Participation Rate	
	f	%
North Dakota	9	2.4
Oklahoma	11	2.9
Oregon	5	1.3
South Carolina	14	3.7
South Dakota	8	2.1
Tennessee	12	3.1
Texas	13	3.4
Utah	5	1.3
Virginia	36	9.4
Washington	1	0.3
West Virginia	8	2.1
Wisconsin	27	7.1

Research Objective Two

To address the second research objective, which sought to describe the current barriers among middle school SBAE teachers related to SAE implementation, participants were asked to rate potential barriers using a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). The results revealed several prominent perceived barriers to SAE implementation (Table 2). The highest-rated barriers were (1) students' willingness to accept responsibility ($M = 3.84$, $SD = 0.96$); (2) lack of student maturity or readiness ($M = 3.76$, $SD = 0.97$); (3) low student engagement or interest ($M = 3.74$, $SD = 0.95$); (4) financial constraints faced by students ($M = 3.65$, $SD = 1.04$); and (5) insufficient class time to focus on SAEs ($M = 3.64$, $SD = 1.14$).

Table 2

Perceived Barriers of SAE Implementation Among Middle School SBAE Teachers (N = 381)

Items	SA %	A %	N %	D %	SD %
Agriculture being an elective course	20.4	40.7	16.4	18.1	4.4
Being a novice teacher	8.0	14.3	25.0	23.7	29.0
Insufficient class time to focus on SAEs	26.8	34.4	18.3	17.4	3.1
Limited family involvement or support	13.8	42.9	24.6	15.6	3.1
Lack of necessary student skills	6.7	36.6	28.1	24.6	4.0
Inadequate support from the school or district	9.0	21.4	26.3	30.8	12.5
Low student engagement or interest	18.1	54.2	13.7	12.3	1.7
Lack of teacher knowledge	6.7	19.6	24.6	31.3	17.8
Communication challenges due to language barrier	3.6	11.6	19.1	31.3	34.4
Limited SAE project options	8.0	31.3	21.0	24.1	15.6
Challenges with navigating AET/record-keeping system	15.6	30.2	28.0	12.9	13.3

Items	SA %	A %	N %	D %	SD %
Insufficient program funding or resources	13.8	32.0	20.4	23.1	10.7
Financial constraints faced by students	20.8	42.9	20.4	12.8	3.1
Lack of student maturity or readiness	21.2	47.3	20.0	8.8	2.7
Issues with student transportation access	19.6	39.5	24.0	12.0	4.9
Students' willingness to accept responsibility	24.0	49.3	14.7	10.2	1.8
Teacher Stress	15.2	33.9	26.8	17.0	7.1
Managing a single-teacher program	25.8	26.7	20.4	15.6	11.5

Note. SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

To further explore how contextual factors may influence perceived barriers, the data were disaggregated by NAAE region (Table 2a). While the overall national trends remained consistent, several region-specific patterns emerged, highlighting variability in teachers' perceptions of barriers to SAE implementation.

Table 2a

Regional Summary of Perceived Barriers to SAE Implementation Among Middle School SBAE Teachers

Barrier Statement	Regional Comparison Summary
Agriculture being an elective course	Teachers in Regions V and VI agreed the most that this was a barrier, while teachers in Region I expressed the least concern.
Being a novice teacher	Agreement levels were consistent across regions, though teachers in Regions I and VI were slightly less likely to view inexperience as a significant barrier.
Insufficient class time to focus on SAEs	Region V reported the highest agreement with this statement, whereas Region I reported the lowest, possibly reflecting scheduling differences among programs.
Limited family involvement or support	Responses were uniform overall, with teachers in Region VI showing slightly greater concern about limited parental involvement.
Lack of necessary student skills	Agreement was similar across all regions, though Regions V and VI indicated somewhat greater concern about students' readiness for SAE work
Inadequate support from school or district	Teachers in Region II most often identified limited district support as a barrier, while those in Region I reported the least agreement.

Barrier Statement	Regional Comparison Summary
Low student engagement or interest	All regions viewed low engagement as a major challenge; however, teachers in Regions V and VI expressed the highest level of agreement overall.
Lack of teacher knowledge related to SAEs	Variation was minimal, though teachers in Regions I and VI were slightly more likely to agree that limited knowledge posed a barrier.
Communication challenges due to language barriers	Regions II, V, and VI reported higher agreement, reflecting greater linguistic diversity in student populations.
Limited SAE project options	Variation was minimal, though teachers in Region I agreed that limited project options restricted SAE implementation.
Challenges with navigating AET/record-keeping system	Agreement was comparable across regions, with slightly higher concern notes in Regions III and VI.
Insufficient program funding or resources	Teachers in Regions II and III expressed the highest agreement, consistent with funding limitations in rural or resource-restricted programs.
Financial constraints faced by students	Variation was minimal, with teachers in Regions II, III, and VI expressing higher agreement.
Lack of student maturity or readiness	Teachers in Regions V and VI most strongly agreed that student maturity limited SAE participation.
Issues with student transportation access	Agreement was moderate across regions, likely due to transportation challenges in both rural and urban areas.
Students' willingness to accept responsibility	Teachers in Region V reported the highest agreement that student responsibility was a challenge, whereas teachers in Region IV reported the lowest.
Teacher stress	Levels of agreement were consistent nationally.
Managing a single-teacher program	Teachers in Regions I, II, and VI expressed somewhat higher agreement than those in Regions IV and V. This may reflect the prevalence of single-teacher programs in more rural or smaller states (ex., northeast states)

Across regions, teachers generally reported similar trends in perceived barriers, though some variation was evident. For instance, Regions V and VI showed the highest overall agreement on several items, especially those related to class time, student readiness, and engagement. Regions II and III reported greater agreement with funding and resource-related barriers, while Region I consistently reflected lower agreement across many statements. This may be partially due to the smaller number of respondents in that Region (n = 21).

Research Objective Three

The final research objective was to describe the professional development needs of middle school SBAE teachers concerning SAEs. We calculated the Mean Weighted Discrepancy Scores (MWDS) for each item using the Borich Needs Assessment Model (1980). Items with a larger MWDS indicate a greater need for professional development than those with a smaller MWDS. All items yielded a positive MWDS, with the following areas yielding the greatest need for professional development: (1) creating lessons where students learn how to use the AET system and how to input information correctly; (2) creating lessons where students learn about the importance/benefits of SAEs; and (3) engaging students in SAEs regardless of their background or available resources (Table 3).

Table 3

Professional Development Needs of Middle School SBAE Teachers Related to SAEs (n = 381)

Professional Development Topic Areas	*MWDS*	Rank
Creating lessons where students learn how to use the AET system and how to input information correctly.	7.77	1
Creating lessons where students learn about the importance/benefits of SAEs (ex. Degrees, awards, record-keeping skills, etc.)	7.56	2
Engaging students in SAEs regardless of their background or available resources	6.87	3
Identifying curriculum resources to teach students about SAEs and SAE categories	6.58	4
Engaging parents, administration, and community stakeholders in SAEs	5.48	5
Supervising student SAE projects	5.02	6

Regional comparisons revealed modest variation in teachers' professional development priorities. The greatest overall need was for creating lessons that teach students how to use the AET system and input information correctly. Teachers in Regions III (MWDS = 7.89) and VI (MWDS = 7.84) reported slightly higher values than the national mean (MWDS = 7.77). Similarly, for creating lessons where students learn about the importance and benefits of SAEs, teachers in Regions I (MWDS = 7.62), V (MWDS = 7.78), and VI (MWDS = 7.66) expressed the strongest need, all of which exceeded the national average (MWDS = 7.56). The need for engaging students in SAEs regardless of their background or available resources was also relatively high nationwide (MWDS = 6.87), with teachers in Regions II (MWDS = 6.96), III (MWDS = 6.93), V (MWDS = 6.98), and VI (MWDS = 6.90) identifying this as a key priority, consistent with earlier findings related to student motivation and equity-related barriers. When identifying curriculum resources to teach students about SAEs and SAE categories, teachers in Regions I (MWDS = 6.69) and VI (MWDS = 6.66) reported higher needs than the national average (MWDS = 6.58), indicating a desire for additional instructional materials. For engaging parents, administrators, and community stakeholders in SAEs, teachers in Regions II (MWDS = 5.60) and VI (MWDS = 5.57) reported slightly higher MWDS scores relative to the national mean (MWDS = 5.48), reflecting continued challenges with family involvement. Finally, teachers in Regions I (MWDS = 5.08), II (MWDS = 5.09), and VI (MWDS = 5.11) reported the

greatest need for professional development related to supervising student SAE projects, aligning with regional trends where single-teacher programs may be more common.

Conclusions and Recommendations

The findings of this national study highlight the multifaceted challenges that middle school SBAE teachers face in implementing SAEs. These challenges span developmental and structural barriers, including limited student maturity, low motivation, inadequate instructional time, limited program funding, and insufficient administrative or community support. These findings align with prior literature that identifies similar obstacles to SAE engagement at both secondary and postsecondary levels (Eck & Davis, 2024; Ford & Lambert, 2025). In terms of professional development, the results suggest that teachers are eager to strengthen their practice and skill set related to SAE implementation but require additional instructional supports and resources to do so.

Barriers to SAE Implementation

Teachers emphasized that developmental readiness remains one of the most significant inhibitors to SAE success, with nearly three-quarters agreeing that students often lack the responsibility or confidence to manage projects independently. The highest-rated items—students' willingness to accept responsibility ($M = 3.84$) and lack of maturity or readiness ($M = 3.76$), highlight that many middle school students are not yet prepared to manage fully independent projects. These findings reinforce Social Cognitive Theory's focus on self-efficacy development and task relevance (Bandura, 1997): when tasks exceed students' perceived ability, engagement declines. Consequently, SAE models for middle school students should be scaffolded to promote gradual skill-building and confidence. Classroom-based or teacher-guided SAEs that incorporate structured reflection, peer collaboration, and manageable tasks can nurture responsibility and ownership over time.

Financial and contextual barriers emerged as significant challenges to SAE implementation. Approximately two-thirds of respondents reported that limited student financial resources and insufficient class time constrained participation. These issues were particularly prevalent in Regions II and III, where teachers also noted greater funding and resource limitations. In contrast, Region I reported the lowest overall agreement, likely reflecting smaller program sizes or fewer participants ($n = 21$). The findings underscore the importance of designing flexible, equitable SAE opportunities that do not rely on personal financial investment. Implementing low-cost or school-based SAEs, such as classroom enterprises or community partnerships, can help mitigate disparities in access. Likewise, addressing limited instructional time through innovative delivery models that extend learning beyond the class period may enhance engagement. Collectively, these results highlight the need for regionally responsive, developmentally appropriate, and resource-conscious approaches to SAE integration in middle school programs.

Professional Development, Capacity Building, and Teacher Support

All teachers reported positive MWDS values, indicating a consistent desire for growth. The highest national priorities were creating lessons where students learn how to use the AET system and input information correctly (MWDS = 7.77) and developing lessons that help students understand the importance and benefits of SAEs (MWDS = 7.56). Regionally, the greatest needs were identified among teachers in Regions III and VI for AET instruction, and among Regions I, V, and VI for helping students recognize the relevance of SAE. Teachers in Regions II, III, V, and VI expressed a strong need for strategies to engage students regardless of their background or resources, aligning with previously reported concerns about student motivation and equity. The consistent appearance of Region VI across multiple categories also points to challenges in states with higher linguistic diversity and varying school support systems.

Drawing on Human Capital Theory (Becker, 1964), these findings reinforce that professional development is not supplementary but foundational to program success. The strong MWDS values for AET instruction and SAE relevance directly point to teachers' desire for applied, skill-based learning that enhances their instructional capacity. Targeted, sustained professional development can strengthen teachers' ability to integrate SAEs within limited class time and design inclusive experiences for younger learners. These results align with quantitative evidence showing that "insufficient class time" and "lack of teacher knowledge" were among the top ten barriers nationally. To address these gaps, professional learning opportunities should focus on practical, ready-to-implement strategies—such as embedding Foundational SAE projects within class instruction. This aligns with prior research highlighting the importance of contextualized, hands-on professional development that promotes technical competence and pedagogical confidence (Belay et al., 2021; Hainline & Smalley, 2023).

In addition to formal professional development, relational supports such as mentorship and peer collaboration can further strengthen teacher efficacy and sustainability in the profession. Teachers in Regions III, V, and VI—who also reported higher perceived challenges related to time, funding, and student readiness—would particularly benefit from mentorship that provides ongoing guidance and emotional support. This interpretation is grounded in data indicating that barriers such as teacher stress ($M = 3.37$) and managing a single-teacher program ($M = 3.41$) were common concerns. Mentorship can help reduce these stressors by connecting novice teachers with experienced colleagues who model successful strategies for implementing SAE. This finding aligns with Social Cognitive Theory (Bandura, 1986), which posits that self-efficacy is strengthened through observation, feedback, and social reinforcement. Establishing mentorship structures or professional learning communities could enhance teachers' confidence and persistence, particularly in programs where teachers report feeling isolated or under-supported. Ultimately, such structures have the potential to improve SAE implementation and strengthen teacher retention within the SBAE profession.

Limitations

While this study provides valuable insights into the experiences and needs of middle school SBAE teachers, it is not without limitations. The findings are based on self-reported data, which may be subject to response bias or social desirability. Furthermore, while the survey was distributed nationally and included participants from 32 states, some geographic regions or subpopulations may have been underrepresented. Participation was most concentrated in the Southeast, Midwest, and Mid-Atlantic regions, with fewer responses from the Northwest, which may have influenced regional comparisons. The study also did not assess the longitudinal impacts of teacher support or track actual changes in SAE implementation over time, nor did it capture student perceptions or experiences—an important perspective for future inquiry.

Recommendations for Practice and Future Research

To build on these findings, future research should examine the long-term effects of professional development and mentorship on teacher efficacy, instructional practices, and student outcomes in SAE participation. Studies should also explore how scaffolded and developmentally appropriate SAE models affect student motivation, engagement, and retention in agricultural education, particularly among historically marginalized or economically disadvantaged populations. Expanding research to include student perspectives, administrator support, and community engagement would further contextualize the systemic factors influencing SAE participation.

From a practice standpoint, state agricultural education programs, teacher preparation institutions, and professional associations should prioritize targeted, regionalized professional development that addresses the specific needs identified in this study. Training opportunities should emphasize AET integration, student engagement strategies, and resource management, while offering practical approaches

for implementing SAEs within time-constrained middle school schedules. Establishing formal mentorship programs and professional learning communities can also strengthen instructional confidence and teacher retention, particularly in single-teacher programs or under-resourced schools. Finally, fostering partnerships between schools, industry, and community organizations can alleviate financial and logistical barriers to student participation, ensuring that SAE experiences are equitable, accessible, and sustainable across diverse school contexts.

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