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Keywords
Experiential learning, SAE, Supervised agricultural experience

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Synthesis of Contemporary SAE Research 1994–2014

Bryan D. Rank[1] and Michael S. Retallick[2]

Abstract

In the 1990s, a series of research syntheses were conducted regarding supervised agricultural experience. These syntheses included supervised agricultural experience (SAE) research from 1964 through 1993. With these past syntheses as the premise, contemporary SAE research was identified, synthesized, and coded into emerging themes. Inclusion criteria for this synthesis required articles to (a) be published in a peer-reviewed journal or national/regional American Association for Agricultural Education research conference proceedings, (b) include research specifically pertaining to SAE, (c) be available and accessible through the search procedures, and (d) be published between January 1994 and December 2014. An exhaustive search was conducted using library databases as well as digital journals and conference proceedings. Themes that emerged from this synthesis were (a) participation, (b) teacher education, (c) benefits, (d) professional development, (e) supervision, (f) scope/structure, (g) economic impact, (h) program quality, (i) learning theory, and (k) international settings. Similar to the previous syntheses, research conducted between 1994 and 2014 was primarily descriptive, conceptually broad, and often limited to relatively small populations such as single states. Additional multistate and national studies are recommended to describe the content and context of SAE instruction in teacher education and to refine quality indicators related to SAE practice.

Keywords: Experiential learning; SAE; Supervised agricultural experience

Introduction

In the 1990s, a series of manuscripts were published by Dyer and Osborne (1995, 1996) and Dyer and Williams (1997a, 1997b) based on a synthesis of supervised agricultural experience (SAE) research. These syntheses included SAE research from 1964 through 1993. Dyer and his colleagues identified perceptions, benefits, participation, scope, administration, teacher satisfaction, time requirements, supervision, evaluation, program quality, student and teacher background, facilities, and the relationship between the National FFA Organization (FFA) and SAE as major subject areas in SAE research (Dyer & Osborne, 1995, 1996). SAE research from 1964 through 1993 was described as primarily descriptive and lacking empirical research (Dyer & Osborne, 1995, 1996; Dyer & Williams 1997a, 1997b). Since that time, the philosophical premise of SAE has continued to evolve, which has given rise to the need to synthesize contemporary SAE research conducted over the past 21 years, analyze the findings, and identify areas for future research.

Conceptual Framework

The model used to conceptualize the integral components that form the foundation of a complete school-based agricultural education (SBAE) program consists of three overlapping circles in a Venn diagram (Talbert, Vaughn, Croom, & Lee, 2014). These three components are (a) contextual, inquiry-based learning through classroom and laboratory interaction; (b) leadership

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engagement through FFA; and (c) planned and supervised, experience-based learning through SAE (Talbert et.al., 2014), which is the focus of this study.

The National Council for Agricultural Education (NCAE) has determined "each portion of the title 'Supervised Agricultural Experience' is significant in describing what is expected of all teachers and students of agricultural education" (NCAE, 2015, p. 1). The agricultural teacher should provide onsite supervision when possible but also through other methods, such as computer technology, written reports, and group meetings, to assist students in planning and conducting their SAE (NCAE, 2015). Contextually, the SAE is based on agriculture and should form a linkage between agriculture, food, and natural resources instruction, the students' interests, and career exploration (NCAE, 2015). However, the SAE component differs from other forms of experiential learning practiced in SBAE, such as inquiry-based classroom or lab instruction, field trips, or FFA competitive events, because it includes career planning, is managed by the student, occurs outside of classroom instruction, and occurs in a real-world or a simulated workplace environment (NCAE, 2015).

Supervised experience is likely to have been the first component of the SBAE model to originate and is thought to be rooted in apprenticeships by which youth learned a trade from a skilled craftsman (Croom, 2008). In the early 20th century, agricultural educator Rufus Stimson pioneered the use of the home project method to give students relevant experience. Stimson proposed that projects should be completed in specific learning conditions with measurable results (Croom, 2008). As SAE has evolved through the years, its context has expanded beyond vocational training in production agriculture. Currently, the NCAE (2015) has defined the types of SAE as exploratory, placement/internship, ownership/entrepreneurship, research, school-based enterprise, and service learning.

Although agriculture teachers articulate the value of SAE as they describe it conceptually, they have difficulty implementing it in practice (Dyer & Osborne, 1995; Retallick, 2010; Wilson & Moore, 2007). This paradox between SAE conceptualization and practice is evidenced by SAE practice not adequately reflecting the conceptual foundation of the three-circle agricultural education model (Lewis, Rayfield, & Moore, 2012a, 2012b; Retallick, 2010; Retallick & Martin, 2008; Wilson & Moore, 2007).

Recent efforts by the NCAE and AAAE have focused on SAE renewal. The NCAE has developed a philosophy and guiding principles for including SAE as a component of SBAE. These NCAE documents outline the purpose of SAE as well as describe the types of SAE that SBAE students can conduct (NCAE, 2015). Additionally, the AAAE has developed a guiding philosophy as well as competencies for agricultural teacher preparation in SAE (AAAE, 2014a; 2014b). In light of this focus on SAE renewal, a synthesis of peer-reviewed research is needed to analyze the SAE research published over the past 21 years.

Purpose

The purpose of this study was to identify, code, and synthesize contemporary SAE research published between 1994 and 2014. The specific objective was to describe themes that have emerged from SAE research.

Methods

According to Thieman, Henry, and Kitchel (2012), "research syntheses are essential to the progression of a particular field of research because they are a collection of past research that is necessary for the systematic construction of knowledge" (p. 84). The focus of this research synthesis was to describe the depth and breadth of SAE research published in the past 21 years.

Search strategies, inclusion criteria, and coding are essential in rigorous research synthesis (Cooper, 2010). The dates for research studies included in this synthesis were from 1994 through 2014. These dates for inclusion were purposefully selected to begin with the research syntheses conducted by Dyer and Osborne (1995, 1996) and Dyer and Williams (1997a, 1997b). The specific search strategies used included an exhaustive search of the library databases, ERIC, and WorldCat. Journal website searches and Google Scholar were also utilized. Keywords and phrases used in the search were *supervised agricultural experience* and *experiential learning + agricult**. These keywords provided a sufficient foundation to discover the breadth of research on the subject of SAE.

Research articles identified in the search were documented and analyzed with an initial screening for relevance based on inclusion criteria that were developed (Cooper, 2010). Inclusion criteria for this synthesis required articles (a) to be published in a peer-reviewed journal or national/regional American Association for Agricultural Education (AAAE) research conference proceedings, (b) to include research specifically pertaining to SAE, (c) to be readily available and easily accessible through the search procedures, and (d) to be published between January 1994 and December 2014. It is important to note that research studies not readily available and easily accessible through the search strategy were not included. It is also important to note that it is common for studies presented at national or regional research conferences to be published later in peer-reviewed journals. In cases in which a study was included in a conference proceeding and published in a peer-reviewed journal with no substantive changes, only the journal articles were included in this study.

Articles and conference proceedings that met the inclusion criteria were analyzed and coded within a coding matrix (Cooper, 2010). This matrix included (a) year published, (b) title, (c) author(s), (d) publication, (e) methods/procedures, (f) conclusion(s)/comments, (g) preliminary theme, and (h) final theme. Manuscripts in the matrix were then coded into final themes that emerged based on content. Research studies often address more than one specific area; therefore, they could potentially fit into more than one theme. Studies that fit into multiple themes were coded for final theme based on the predominant theme addressed in the findings and conclusions. The coding matrix categories for publication, methods/procedures, and final theme were analyzed using the IBM SPSS Statistics 19 statistical package, and descriptive statistics were reported.

Findings

The search strategies revealed 75 research studies that fit the inclusion criteria. The primary publication used for dissemination of SAE research was the *Journal of Agricultural Education* (n = 48). Peer-reviewed journal articles that met the inclusion criteria were also found in the *Journal of Southern Agricultural Education Research* (n = 12) and the *Journal of Career and Technical Education* (n = 3). Altogether, 63 of the 75 manuscripts that fit within the search criteria were published in peer-reviewed journals. Research was also published in the national (n = 6) and regional (n = 6) conference proceedings of the AAAE.

Most SAE research methods were descriptive and often based on the participants' perceptions. The most common method of data collection was a survey instrument (n = 45) followed by Delphi techniques (n = 7). However, research studies were also identified that used mixed methods; qualitative methods such as interviews, focus groups, historical perspectives, and research syntheses; as well as quantitative analyses of longitudinal trend studies, economic impact, or test scores.

Research studies that met the inclusion criteria were coded into themes based on the predominant theme addressed in their findings and conclusions. The themes that emerged from this synthesis were (a) participation, (b) teacher education, (c) benefits, (d) professional

development, (e) supervision, (f) scope/structure, (g) economic impact, (h) learning theory, (i) program quality, and (j) international settings (Figure 1).

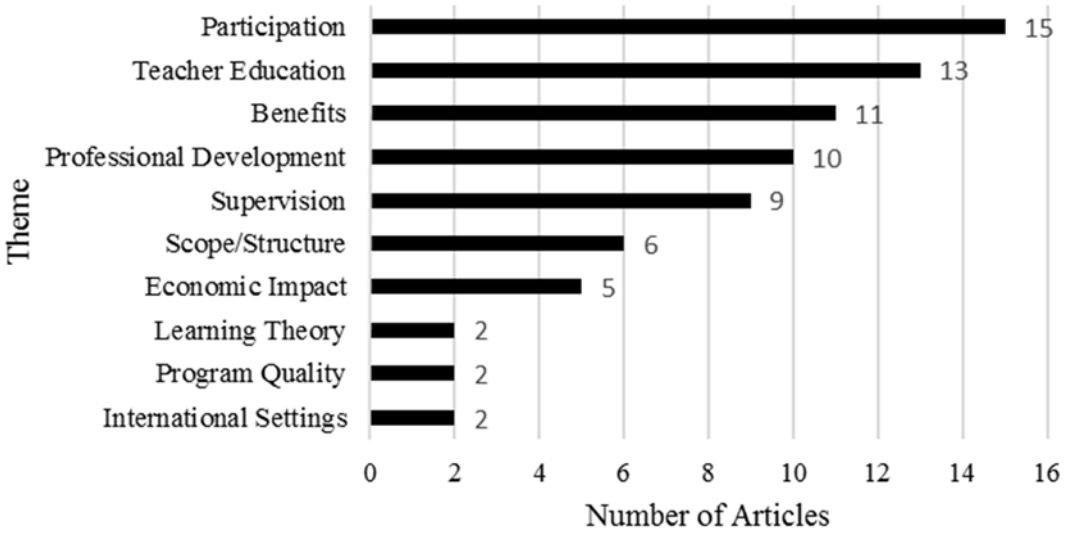

Figure 1. The frequency of themes of SAE research articles, 1994-2014.

Participation

Historically, SAE participation has been a concern for agriculture teachers since the beginning of SBAE (Bird, Martin, & Simonsen, 2013). Participation in SAE has been shown to be continually declining (Croom, 2008; Lewis et al., 2012a, 2012b; Retallick & Martin, 2008, Steele, 1997). Steele (1997) found a 10% reduction in SAE participation in New York between 1983 and 1997. In an 11-year trend study, Retallick and Martin (2008) identified a reduction in the percentage of Iowa students participating in SAE, although the overall SBAE enrollment was increasing, indicating a widening gap between SBAE enrollment and SAE participation. Only 46.1% of students in Florida, Indiana, Missouri, and Utah reported having an SAE (Lewis et al., 2012b). SAE participation in practice does not adequately reflect the conceptual foundation of the three-circle agricultural education model (Lewis et al., 2012a, 2012b; Retallick, 2010; Retallick & Martin, 2008).

Although agriculture teachers articulate the value of SAE as they describe it conceptually, they are having difficulty implementing it in practice (Retallick, 2010; Wilson & Moore, 2007). As Wilson and Moore (2007) stated, "there is a paradox between the value teachers place on SAE and the manner in which SAE is being implemented" (p. 89). Considering this paradox, Wilson and Moore suggested that teachers realize the importance of SAE, so rather than spending time and resources to convince agriculture teachers of the value of SAE, resources would be better utilized in training teachers to implement new types of SAE.

Wilson and Moore (2007) argued, even if teachers perceive a task as worthwhile, they may not carry out the task because of the barriers they perceive. According to Wilson and Moore (2007), "the third stage of Locke's motivational schema (1991) states if teachers perceive barriers to performing a task, even if it is a worthwhile task, they still may not carry out the task" (p. 90). Retallick (2010) identified barriers to SAE implementation as "(a) changing demographics and societal attitudes, (b) mechanics and structure of schools, (c) resource availability, (d) image, and (e) agricultural education system" (p. 64) based on the perspective of agriculture teachers. Additionally, Graham and Birkenholtz (1999) identified a lack of background, training, and

educational materials as a barrier to engaging nontraditional students in SAE. Similarly, Wilson and Moore (2007) identified a need for teachers to be trained in new SAE types; "given the number of students that teachers have in their classes and the time constraints, it may be time to radically think outside the box and embrace new SAE concepts such as agricultural service learning" (p. 90).

From the students' perspectives, encouragement from agriculture teachers was perceived as an important factor that influenced their participation in SAE (Lewis et al., 2012a). However, in a Delphi study of the characteristics of innovative SBAE programs the agricultural education panelists did not reach consensus on the statement that every student should be involved in a specific SAE (Rayfield, Murphy, Briers, & Lewis, 2012). Additionally, students indicated that they disagreed with the notion that involvement in other school and community activities decreased their participation in SAE programs and indicated that awards had little influence on their participation (Lewis et al., 2012a). With the understanding that agriculture teachers cannot be in more than one place at a time, the help and encouragement of teachers has an influence on student SAE participation (Lewis et al., 2012a). Agriculture teachers who believe that SAE is important and have effective strategies to overcome barriers are more likely to implement SAE (Retallick, 2010).

Teacher Education

Preservice agriculture teachers are prepared for the teaching profession using a combination of coursework, early field experience (EFE), and student-teaching. McLean and Camp (2000) found "curricular structure differs widely among agricultural teacher education institutions" (p. 31). In a study of 10 selected agriculture teacher education programs, all of the programs included SAE or an equivalent topic at various points within their curriculum; however, only three of the selected institutions reported a separate SAE course (McLean & Camp, 2000).

Wolf (2011) found that beginning teachers reported the least self-efficacy in the SAE domain in comparison to the classroom and FFA domains, suggesting that more emphasis should be placed on SAE in teacher preparation. In a separate study, Rubenstein, Thoron, and Estepp (2014) found that preservice teachers who had completed their student teaching internship reported moderately high self-efficacy for SAE competencies. These preservice teachers also regarded SAE as an important part of SBAE with 95% of study participants reporting that SAE was important or somewhat important (Rubenstein et al., 2014).

In a study of Texas A&M University agricultural education student teachers, Harlin, Edwards, and Briers (2002) found that, although student teachers continued to regard SAE as an important component of SBAE, perceptions of the importance of SAE declined after their 11-week student teaching experience. However, in a similar study of Oklahoma State University student teachers, the mean composite score for the SAE construct increased following student teaching (Young & Edwards, 2006a). Although Oklahoma preservice teachers perceived that SAE was more important after their student teaching experience, the element related to SAE was rated of lowest importance among all of the elements of their student teaching experience in both the pretest and posttest (Young & Edwards, 2006a). This lower rating of importance in comparison to the other elements of the student teaching experience mirrored the ranking of the SAE construct by Oklahoma cooperating teachers (Young & Edwards, 2006b). Texas cooperating teachers also indicated that they perceived the SAE construct as important; however, they indicated that it was less important than all but one of the constructs comprising the essential elements of the student teaching experience (Edwards & Briers, 2001).

Student teachers have the opportunity to supervise SAE regardless of the semester in which their student teaching experience occurs; however, student teachers in the spring semester devoted more time to supervising SAEs (Robinson, Krysher, Haynes, & Edwards, 2010). Student teachers should supervise a variety of SAEs, but they are limited to the SAEs in existence at their

cooperating centers (Robinson et al., 2010). According to Rubenstein et al. (2014), "SBAE preservice programs should work to promote authentic experiences for preservice teachers to develop, implement, maintain, sustain, evaluate, supervise, and communicate an SAE program" (p. 81).

Benefits

SAE is considered to be beneficial in developing career skills. Ramsey and Edwards (2011) found that a panel of industry experts agreed that students should learn entry-level technical skills through their SAE that will enhance their employability in the agriculture industry. Similarly, a panel of agriculture teachers reached consensus on entry-level career skills that could be learned in each of the seven Oklahoma SBAE pathways (Ramsey & Edwards, 2012). Additionally, Robinson and Haynes (2011) found that alternatively certified teachers in Oklahoma valued SAE as a method to prepare students for careers by developing college and life skills and "these teachers expect the SAE program to teach students responsibility, accountability, and work ethic" (p. 54). Considering the benefits students receive from SAE participation, North Carolina teachers believed students with special needs received the same benefits from participation as do other students but identified fewer opportunities for SAE involvement (Johnson, Wilson, Flowers, & Croom, 2012).

Researchers have also investigated whether there is an academic benefit to SAE participation. Cheek, Arrington, Carter, and Randal (1994) found a low but positive correlation between SAE participation and students' achievement in agriscience courses. There was also a low but positive association on the science portion of the Georgia High School Graduation Test (GHST) between SAE engagement and student achievement (Ricketts, Duncan, & Peake, 2006). However, in a separate study limited to regular and special education students, SAE activity level did not have a statistically significant relationship with GHST science achievement (Clark, Parr, Peake, & Flanders, 2013).

Marx, Simonsen, and Kitchel (2014) found that SAE has less influence on students' career decisions than does classroom instruction or FFA. However, SAE offers the opportunity for students to network and build relationships with community members (Robinson & Haynes, 2011).

Professional Development

Developing SAE opportunities for students has been consistently identified among the professional development needs for agriculture teachers (Garton & Chung, 1996, 1997; Layfield & Dobbins, 2002; Ricketts, Duncan, Peake, & Uesseler, 2005; Sorensen, Tarpley, & Warnick, 2010). Wolf (2011) recommended that SAE management become "a focus of professional development for beginning teachers" (p. 172) to increase their self-efficacy in the SAE domain. The need for professional development regarding developing SAE opportunities for students as well as supervising SAE programs for all students ranked highly in a study of middle and high school agriculture teachers, with middle school teachers ranking these two topics higher than high school teachers did (Roberts & Dyer, 2003). In addition to developing and supervising SAE programs, agriculture teachers perceived preparing FFA proficiency award and degree applications as areas in which they needed continuing education (Garton & Chung, 1996, 1997; Layfield & Dobbins, 2002; Ricketts et al., 2005; Sorensen et al., 2010; Swafford & Friedel, 2010).

Supervision

To be successful, agriculture teachers must be capable of facilitating SAE by actively supervising student projects through planning and visits (Roberts, Dooley, Harlin, & Murphrey, 2007). Similarly, Roberts and Dyer (2004) described the characteristics of effective teachers related to SAE as having SAE knowledge as well as actively supervising and encouraging their

students' projects. Tennessee agriculture teachers indicated that teachers should be involved in planning and supervising SAEs and that SAE supervision should be part of their duties during their extended summer contract (Swortzel, 1996). However, the amount of time agriculture teachers spent supervising SAEs varies throughout the year (Torres, Ulmer, & Aschenbrener, 2008). Torres et al. (2008) recommended "teachers need to distribute their time more consistently over the year when making SAE observations rather than allowing this task to be a seasonal effort" (p. 85).

Administrators in Oklahoma indicated that the first-year agriculture teachers they supervised performed in the range from good to excellent in providing adequate supervision to students' projects and requiring students to maintain record books but only fair to good in requiring all students to conduct meaningful SAE programs (Weeks & Terry, 1999). Similarly, principals in North Carolina expressed positive perceptions of SAE but did not think that SAE opportunities were provided to all students (Rayfield & Wilson, 2009). These North Carolina principals agreed that agriculture teachers should be employed on a year-round contract but did not think that agriculture teachers were conducting SAE visits during the summer months (Rayfield & Wilson, 2009). Rayfield and Wilson (2009) recommended that principals express their perceptions of the value of SAE to teachers through recognition and evaluations based on SAE implementation and supervision.

Scope/Structure

The scope and structure of SAE have evolved over time. The Vocational Education Act of 1963 expanded the scope of agricultural education and ended mandatory SAE (Graham & Birkenholtz, 1999; Martin, 2010). Prior to the passage of the act, local programs were already developing a broader view of SAE (Martin, 2010). According to Martin (2010), "the rise of nonproduction SAEs and agriculturally-related occupational curriculum was stimulated by local community needs and not federal legislation" (p. 51). More recently, increasing enrollment of nonfarm students in agricultural education led to an increase in placement SAEs in Missouri between 1988 and 1997 (Graham & Birkenholtz, 1999). In addition to changing demographics, "as the scope of agriculture broadens, our concept of Supervised Agricultural Experience must be altered to meet the demand of students interested in new areas of agriculture" (Camp, Clarke, & Fallon, 2000, p. 20). For example, Texas agriculture teachers acknowledged that students should be involved in biotechnology-related SAEs (Mowen, Wingenbach, Roberts, & Harlin, 2007).

Roberts and Harlin (2007) recommended that agriculture teachers consider the individual goals of students to encourage appropriate projects. According to Roberts and Harlin (2007), "this implies that although two students may have similar projects, the intended learning outcomes may differ considerably (e.g., technical skill mastery vs. personal development)" (p. 53). For example, Rayfield and Croom (2010) proposed developing and encouraging age-appropriate research and exploratory SAEs in middle school programs that can be expanded upon when the students reach high school. Although new classifications of projects have been added to be more inclusive of the types of projects students conduct, there is a risk that the scope of innovative projects may be changed to fit into an existing category (Roberts & Harlin, 2007).

Economic Impact

SAE has been shown to have a substantial economic impact (Graham & Birkenholtz, 1999; Hanagriff, Murphy, Roberts, Briers, & Linder, 2010; Retallick & Martin, 2005; West & Iverson, 1999). Graham and Birkenholtz (1999) reported that in 1997 the average SAE student labor income from ownership and placement SAEs in Missouri was $1,994 per student for a statewide total of over $31.8 million in SAE labor income. This total is nearly double the total of SAE student labor income in Missouri for 1988 (Graham & Birkenholtz, 1999). Research conducted by West and Iverson (1999) showed that typical Georgia SBAE programs in the late 1990s contributed $31,336

from entrepreneurship, $39,176 from placement, and $832 from improvement SAEs for a total contribution of $71,344 per department to their local economies. This local SAE program economic value was extrapolated to estimate a statewide total economic value of over $12 million derived from SAE programs in Georgia (West & Iverson, 1999). More recently, an 11-year trend study in Iowa showed that the average return from SAE per tax dollar invested in a SBAE program was $1.66 and that the annual growth rate of return on tax dollars was 5.47% (Retallick & Martin, 2005). Over these 11 years (1991-2001), the total value of SAE earned income and value of unpaid hours in Iowa grew at an average annual rate of 6.05% from nearly $10.4 million to nearly $18.7 million (Retallick & Martin, 2005). In Texas, Hanagriff et al. (2010) showed annual economic impact of nearly $189.4 million from animal, horticulture, and crop entrepreneurship SAEs and associated travel expenses.

Program Quality

Researchers have investigated SAE program quality in an effort to identify and develop program quality indicators. Quality indicators for SAEs identified by Jenkins and Kitchel (2009) included diversity in SAE types; time for agriculture teacher supervision; up-to-date recordkeeping; assistance by instructors, parents, and employers; goal setting; and student satisfaction. Similar SAE quality themes emerged from a focus group of American FFA Degree Star finalists including goal planning and authentic learning that leads to career growth, utilization of program partners (e.g., agriculture teachers, parents, and the community), personal satisfaction, and complete records (Rubenstein & Thoron, 2014). Additional SAE quality themes identified by the American FFA Degree Star finalists included income from the SAE program, FFA participation awards, and degrees, as well as hard work and program growth (Rubenstein & Thoron, 2014).

Learning Theory

According to Baker, Robinson, and Kolb (2012), "traditionally, educators have identified SAE programs as the primary experiential learning tool in agricultural education" (p. 8). Experiential learning theory is based on the constructivist view that learning is a process of connecting experiences (Baker et al., 2012). This relationship with constructivism is further described as SAE practice being rooted in the middle-range theory of experiential learning and falls within the spectrum of the grand theories of social constructivism and cognitive constructivism (Martin & Henry, 2011).

Baker et al. (2012) stated that SAE does not necessarily need to be directly connected to what is taught in the classroom, adding, "what is most important, however, is allowing students to identify an area of interest or passion and assisting them in building a project around that area of interest" (p. 6). Meaningful learning in SAE requires purposeful cognitive processing to make meaning of concrete experiences (Baker et al., 2012). According to Martin and Henry (2011), "learning needs to be intentional not accidental" (p. 221).

International Settings

Two studies were found that described the concept of SAE applied in international settings. Although this synthesis was focused primarily on SAE as a component of SBAE in the United States, these two studies were included because they show how the same SAE concept can be applied in areas around the world and because the inclusion criteria did not limit SAE to the United States. A study conducted in Uganda showed that the SAE method contributed to students' learning and the transfer of that learning to the students' home farms (Okiror, Matsiko, & Oonyu, 2011). The study found that of the two groups - home gardening and school gardening - the school gardening group was slightly more successful in comparison to the students with home gardens. Okiror et al. (2011) attributed the lower performance of the home gardening groups to weaker

supervision by teachers during home visits and, furthermore, found that home gardens, as well as school gardens, should be used in agricultural education in Uganda and that the teachers should be trained in SAE methods to better supervise home visits. Egyptian agricultural technical school teachers were surveyed to determine their knowledge and application of placement SAE competencies (Barrick, Roberts, Samy, Thoron, & Easterly, 2011). In comparison to needs assessments conducted in the United States that include SAE, the Egyptian teachers had in-service needs similar to their counterparts in the United States (Barrick et al., 2011).

Conclusions and Recommendations

Contemporary SAE research has focused primarily on student participation, the benefits of SAE, preservice teacher education, and professional development for practicing teachers. The most common research methods revealed in this synthesis were descriptive and based primarily on study participants' perceptions. SAE research was contextually broad and, with few exceptions, focused on relatively small populations, such as single states. The extensive use of survey methods and the broad context of research conducted are consistent with the findings of Dyer and Osborne (1995, 1996) and Dyer and Williams (1997a, 1997b) relating to SAE research conducted between 1964 and 1993. Perhaps the most important conclusion that can be drawn from this synthesis is that contemporary SAE research is still focused on very similar themes to the ones that were identified over 20 years ago. Together with the previous work of Dyer and his colleagues, this synthesis provides a 50-year overview of SAE research. Over this period, it is apparent that there is a need for experimental and quasi-experimental research in addition to larger multistate and national descriptive studies to provide empirical data relating to SAE research questions.

Although agriculture teachers value the concept of SAE and can describe it conceptually, they are having difficulty implementing it in practice (Dyer & Osborne, 1995; Retallick, 2010; Wilson & Moore, 2007). Wilson and Moore (2007) concluded professional development for agriculture teachers should not be focused on the need for SAE or its value; "teachers already know the politically correct answer" (p. 89). Rather, teachers need professional development focused on improving quality and implementation of SAE in their programs (Wilson & Moore, 2007). Descriptive and empirical research are needed to identify practical methods that preservice and in-service agriculture teachers can use to implement and manage SAE programs as well as research to identify how best to disseminate this information to preservice and in-service teachers. More research is also needed to identify where and to what extent SAE instruction occurs within agriculture teacher education programs as well as the content and context of the preservice SAE curriculum. Two such research topics to consider are the extent to which the SAE philosophy (AAAE, 2013a) and SAE competencies (AAAE, 2013b) for agriculture teacher education are incorporated into the teacher education curriculum in programs across the country as well as the approach teacher educators use to teach these competencies and objectives.

Research has shown that SAE can be a beneficial learning experience (Dyer & Williams, 1997a; Ramsey & Edwards, 2004; Rickets et al., 2006) and is valued by stakeholders (Rayfield & Wilson, 2009). However, more research is needed to identify new methods and strategies to overcome barriers and increase participation in this learning opportunity for all SBAE students. Wilson and Moore (2007) suggested that agriculture teachers should have professional development focused on implementing new types of SAE such as service learning. The NCAE (2015) has recognized school-based enterprise and service learning as new SAE types. Professional development efforts are needed to increase awareness of these new SAE types and to provide teachers with the tools to implement them. Agriculture teachers play a role in student participation by encouraging the students to develop an SAE (Lewis et al., 2012a). These new SAE types offer agriculture teachers new options to use to encourage students to develop SAE programs. Research

should be conducted to describe how and to what extent agriculture teachers encourage participation.

Additional research should be conducted to develop SAE quality indicators based on learning objectives. It is imperative for the profession to decide what learning outcomes are expected from a quality SAE program. SAE is perceived to build employability skills, such as responsibility and positive work attitudes (Dyer & Williams, 1997a; Robinson & Haynes, 2011), as well as provide students with entry-level career skills (Ramsey & Edwards, 2011, 2012). A method or guideline to quantify the extent to which these skills are achieved is needed. Multistate or national studies should be conducted to determine quality indicators for all SAE types and if the same quality indicators apply to all SAE programs or if program quality is best determined at the local level.

SAE continues to be an area of the SBAE model that has difficulty achieving a high degree of participation (Bird et al., 2013; Croom, 2008; Lewis et al., 2012a, 2012b; Retallick & Martin, 2008, Steele, 1997). Standards, best practices, and educational materials should be developed and improved to help agriculture teachers involve more of their students in SAEs as well as plan and supervise the broad variety of SAEs. SAE competencies, course objectives, and lesson plans have been developed for teacher education (Barrick et al., 2015). These educational materials are readily available and provide a framework to prepare preservice teachers to conduct successful SAE programs. A similar effort is needed to develop national competencies, professional development, and curriculum materials to assist teachers in overcoming perceived barriers to implementing SAE and to communicate clear learning objectives to students, parents, and school administrators. If SAE is to remain a viable part of SBAE for all students, it is essential to develop quality indicators and learning outcomes for each type of SAE to measure its effectiveness as well as develop SAE educational materials agriculture teachers can use to address specific barriers to SAE participation and facilitate student learning.

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