

# Needs Assessments for School-based Agricultural Education Teachers: A Review of Literature

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## Abstract

*School-based agricultural education (SBAE) programs have become more diverse with the ever changing and growing agriculture industry. Agricultural education teachers are challenged with expanding their knowledge and competencies to effectively teach and design successful SBAE programs. Needs assessments aid in providing guidance for professional development to better equip teachers with adequate knowledge, experiences, resources and materials. To better understand how agricultural education teacher's needs have changed or remained the same, this synthesis provided insight into teacher needs assessments from 1983 to 2015. While some competencies revealed inconsistent results, several competencies produced overwhelmingly cohesive results. Findings indicated Computer Technology, Program Administration, Public Relations, FFA/Program Management, Managing Student Behavior, and Development and Supervision of SAE projects as consistent needs of agricultural education teachers. Less emphasis was needed in professional development in technical skills related to the AFNR career pathways. A variation of needs between experienced and beginning teachers has existed. Recommendations included addressing emerging needs in 21st century competence and working with special needs. To emphasize content focus, development of a consistent instrument to assist teacher educators and national organizations with designing professional development opportunities to meet the current needs of agricultural education teachers in all stages of their careers was recommended.*

**Keywords:** agricultural education; competencies; in-service needs; professional development; school-based agricultural education; teacher needs assessments

## Introduction

It has been stated “many teachers may believe that their skills or knowledge are inadequate for providing students with the necessary skills to face the demanding world” (Sorensen, Tarpley, & Warnick, 2010, p. 1). During a time when supply and demand concerns continue to plague School-based Agricultural Education programs (SBAE) (Foster, Lawver, Smith & Thompson, 2016) it is important to analyze all possible avenues to support pre-service and in-service teachers to help improve retention.

According to the 2017 National Agricultural Education Teacher Supply and Demand Executive Summary, 702 agricultural educators left the classroom in the 2016-17 school year. Major reasons for leaving beyond retirement included employment in business/industry, extension, or production agriculture/farming, termination, shift to teach a different content area or to school

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administration, caregiver, and continuing education (Smith, Lawver, & Foster, 2018). Determining the competencies needed for the agriculture and natural resource workforce and the competencies needed to educate students in these areas during a time when college and career preparedness has become an important focus supported our research question, have the needs of agricultural education teachers remained the same or changed over time? Therefore, we sought to synthesis teacher needs assessments in SBAE programs across three decades, from 1983 to 2015. The need for a review of literature derives from a situation in which something is needed or warranted in relation to either mature or emerging topics (Torraco, 2005). As recommended by Duncan, Ricketts, Peake, and Uessler (2006), “as the number of states with timely and relevant needs assessment data increases, researchers should analyze data to identify national trends in agricultural education” (p. 33).

In-service needs assessments have served as a beneficial tool to discover the needs and competencies of teachers within agricultural education. University agricultural education programs have historically identified appropriate in-service topics for the training of agriculture instructors (Barrick, Ladewig, & Hedges, 1983). Agriculture is a diverse and ever-changing industry, which can make it challenging for agricultural education teachers to stay current in their knowledge base.

“Because of the diversity of activities and the enormous amount of content taught within the realm of agricultural education, most agricultural education instructors require some form of in-service on a regular basis to be able to cope with the demands of the profession” (Sorensen et al., 2010, p.1). Due to the vast amount of technical knowledge and skills agricultural educators are required to possess, how do we determine which qualities of teacher knowledge are most essential? In 1999, Wilson and Berne posited “the ‘what’ of teacher learning should be identified, conceptualized, and assessed” (p. 203).

The need to define the categories of knowledge teachers should possess in relation to content areas has existed (Desimone, 2009). Consistent and timely in-service needs assessments can be of great use to assist in determining which categories should be covered when designing in-service professional development for agricultural education teachers. In-service professional development providers should periodically monitor the needs of beginning teachers and provide assistance based upon current needs as they change over time (Birkenholz & Harbstreit, 1987). Agricultural education teachers have been willing to learn and have requested in-service education to improve the quality of their teaching. Teachers have had a continuing desire and need for in-service training to ensure their skills will remain current (Barrick et al., 1983). Evaluating the results of in-service needs assessments from varying states, level of teacher experience, and background can inform how teachers’ needs for professional development can be more efficiently addressed. Trends and differences within teacher in-service needs assessments should be observed to determine the types of in-service that will be provided to agricultural education teachers in the future (Layfield & Dobbins, 2002).

Priority 3 of the National Research Agenda of the American Association for Agricultural Education calls for a “Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21<sup>st</sup> Century.” Priority 3 described “Utilizing research to draw a connection between the impact of our academic programs and student preparedness and success is essential for survival and sustainability of agricultural leadership, education, and extension education, but also for agricultural communication” (Stripling & Ricketts, 2016, p. 32). Previous literature suggested studying needs assessment research on a national scope to determine common needs (Layfield & Dobbins, 2002). Analyzing individual state needs assessments will better assist in determining how to improve teacher professional development opportunities across the nation. A proliferate of

timely and relevant involvement in needs assessment studies could prove to be beneficial in identifying trends to determine the focus of agricultural education and provide improved preparation for educators (Duncan et al., 2006).

### Conceptual Framework

National efforts to advance our schools, improve teacher quality, and increase student achievement spark the need for authentic teacher professional development (Opfer & Pedder, 2011). Professional development is one important way to address the concerns for improving our schools, teachers, and students. Learning is an ongoing transformation of both knower and knowledge (Opfer & Pedder, 2011). Continuing development and learning of teachers is one of the keys to improving the quality of schools in the United States. Effective professional development consists of following a conceptual framework that provides for testing a theory of teacher change and instruction. Desimone’s (2009) proposed core conceptual framework for studying the effects of professional development on teachers and students is presented in Figure 1 and provided the context for this synthesis of literature. The framework consists of five core features of professional development: 1) content focus 2) active learning 3) coherence 4) duration, and 5) collective participation. The five core features are intended to drive an increase in teacher learning of knowledge and skills where a change in attitude drives a change in practice and ultimately influences student achievement. Engagement in professional development can increase teacher knowledge and skills. In turn, the content of teacher instruction can also be improved (Desimone, 2009). We believe Desimone (2009) provided a framework for professional development that can be applied to future research and practice in our field, given that needs assessments for SBAE teachers have provided a context to prioritize the content focus, which is one of the five core features of professional development in the framework. Content focus refers to the connection between learning that concentrates on subject matter content and how students learn that content. Documented as the most significant of the five core features of professional development, Desimone (2009) posits improved teacher knowledge and skills correlates to increased student achievement.

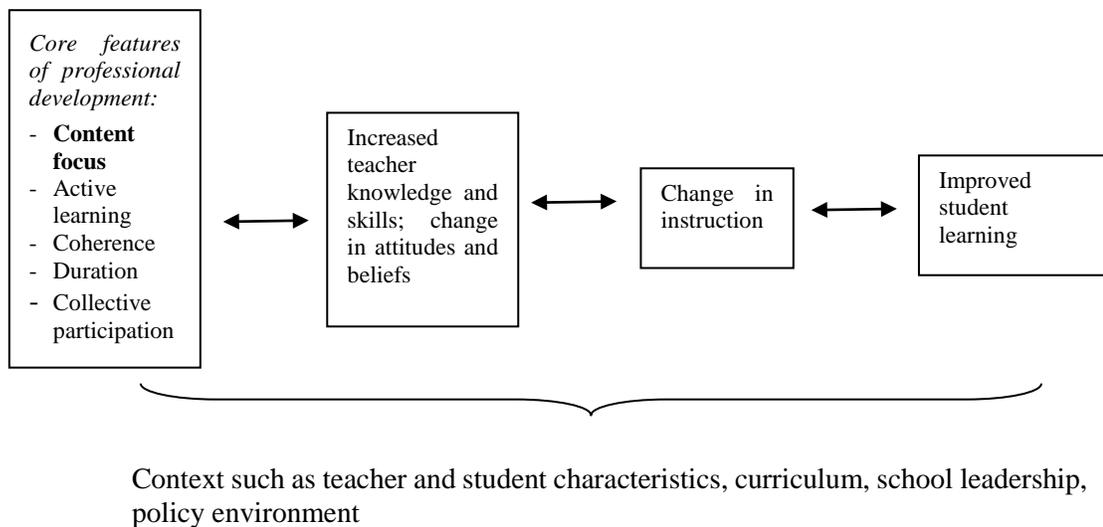


Figure 1. Proposed core conceptual framework for studying the effects of professional development on teachers and students (Desimone, 2009, p. 185).

## Purpose and Objectives

Literature reviews can be utilized to identify an appropriate topic, justify the need of the review, and retrieve and analyze the literature to bring additional meaning and understanding (Torraco, 2005). Barrick et al. (1983) conducted the first needs assessment of agricultural education teachers found in the literature base. More recently, a needs assessment of Idaho agricultural education teachers was conducted by Touchstone (2015). Davis and Jayaratne (2015) conducted a study which focused on preparing agriculture teachers for the 21<sup>st</sup> century. The purpose of this study was to synthesize agricultural education teacher needs assessments over the past three decades from 1983 to 2015 and determine recommendations for guidance in conducting future needs assessments based on trends over time. Using Desimone's (2009) conceptual framework for studying the effects of professional development on teachers and students, we centered our synthesis specifically in relation to content focus and organized the data and findings by decade to identify similarities and changes in professional development need over time. Driven by our research question (Have the needs of agricultural education teachers remained the same or changed over time?) the intent of this research was to synthesize what has persisted in the past to offer guidance for future research and practical application with forthcoming needs assessments and professional development for SBAE teachers. The purpose of this research was supported by the following objectives: 1) Summarize the similarities and changes in competencies needed by agricultural education teachers as identified throughout three decades of needs assessment research conducted for SBAE teachers from 1983 to 2015 and 2) Identify consistent and emerging needs for SBAE teachers for professional development derived from the literature for needs assessments of SBAE teachers from 1983 to 2015.

## Methods and Procedures

The design of this study was a synthesis of the literature pertaining to SBAE teacher needs as described by Kovar and Ball (2013). An integrative literature review, as described by Torraco (2005), includes a critique as well as a conceptualization and synthesis of the pertinent research. To accomplish the purpose of this study, a review of literature was conducted on research pertinent to agricultural education teacher needs assessments. The reviewed literature was gathered from a database search of the *Journal of Agricultural Education* and the *Journal of Career and Technical Education* using the following key words: in-service needs, needs assessment, in-service teacher education, perceived needs, professional development needs, development needs, teaching competencies, in-service training, and in-service education. Given the number of studies that have been conducted on the topic of teacher needs assessments, researchers focused only on peer-reviewed articles in the journals most relevant to agricultural education. A meta-analytical approach was used for this study. Meta-analysis combines results from similar individual studies by integrating and summarizing the information into an inclusive viewpoint (Newton & Rudestam, 1999). In an effort to make overarching conclusions, commonalities and differences were noted as literature was synthesized, combined, and compared to one another. A form of meta-analysis was conducted by including the results of the 24 studies conducted in sixteen states (FL, GA, ID, IL, LA, MN, MO, MS, NC, NM, OH, OR, PA, SC, TX, UT) within a thirty-two-year period (1983 – 2015). Each state conducted its needs assessment in isolation and the instrumentation varied greatly.

Reviewed literature was separated by decade using the rationale that every ten years teacher needs may differ with changing times and technology. Each study was compared with studies within each decade as well as outside of the study's decade. Each article was evaluated for its suitability and relevance to the present literature review based on the key words chosen. Research pertaining to technical agriculture needs assessments was not included since insufficient numbers

of studies were identified across all technical agriculture content areas and they did not pertain to the focus of the study as identified by the purpose and key words. In total, 24 studies from 1983-2015 were identified and used as a part of this literature review. Given there is no standardized format for organizing integrative literature reviews, we chose to organize the data by decade to illustrate similarities and/or changes over time. We recognized organization by relationship is more typically utilized when synthesizing literature through an integrative review (Toracco, 2005); however we chose a chronological approach to reveal change over time. To address the purpose of the review, the selected studies were categorized by pre-determined themes (FFA, Program, SAE, and Skills), competency, and decade of publication. The pre-determined themes related specifically to the major components of a SBAE program and, therefore, the potential competency needs of teachers (Kovar & Ball, 2013; Torracco, 2005). In this case, themes are included within each decade as presented in Table 1. We wish to acknowledge a potential limitation with instrumentation in the 24 needs assessments we synthesized. The instruments utilized for SBAE needs assessments research from 1983-2015 varied in subject matter and therefore did not prove to be a means for data organization that met the authors' intended purpose. We sought to synthesize the similarities and changes in competencies and identify consistent and emerging needs over the three decades by analyzing and comparing what has been done to-date to offer guidance on potential next steps for the future.

### **Review of Literature**

The following review of literature is presented to provide context and serve as an overview of the origination of needs assessments conducted for SBAE teachers within each decade beginning in 1983 and progressing to 2015.

#### **Origination of Needs Assessments for SBAE Teachers during the 1980's:**

Beginning in 1983, Barrick et al. developed a systematic approach to identify technical in-service needs of teachers. Additionally, Claycomb and Petty (1983) and Birkenholz and Harbstreit (1987) conducted research related to analyzing the perceived needs of SBAE teachers. Teacher in-service needs were recognized by identifying the importance of, relative knowledge of, and "relative ability to provide application of specific technical agriculture topics" (Barrick et al., 1983, p.14). Barrick et al. (1983) did not provide data as to the specific subject areas teachers responded to through the survey instrument. The study revealed "A combination of two or more rankings must be considered to form conclusions regarding in-service education needs" (Barrick et al., 1983, p.19).

As agricultural education teachers progressed in their careers, in-service needs also progressed, as experience, knowledge, and resources became more readily available or depleted. Claycomb and Petty (1983) aimed to determine the perceived needs of teachers in Missouri at varying times throughout the individual's career. The longitudinal study determined the needs of teachers at specific stages in their career by utilizing survey methodology. The "Beginning Teachers' Needs Questionnaire" was developed and divided into nine areas.

Based upon surveyed subjects' responses, all perceived needs categories changed rankings except for FFA and Program Development and Planning. The need for other subject areas decreased over the years, likely due to exposure and gaining experience in the subject areas. One of the most drastic changes found in the study was in Program Administration, as it was rated highest for all pre-service teachers and lowest for all teachers with one year of experience. Human Relations also underwent some differences in rankings from pre-service to experienced teachers. Human Relations was ranked lowest of all items by pre-service teachers, but was the second highest in-

service need for experienced teachers (Claycomb & Petty, 1983). The need for assistance in Human Relations and Program Administration outweighed technical expertise during the first year of teaching.

According to Claycomb and Petty (1983), many agriculture teachers graduate from preparation programs with a lack of necessary technical agriculture knowledge. Claycomb and Petty's (1983) findings highlighted the fact that needs for first-year teachers were not necessarily the same as second-year teachers and concluded that in-service needs of beginning teachers changed over time. Further recommendations indicated in-service needs of agricultural education teachers should be assessed and prioritized on a continual basis (Birkenholz & Harbstreit, 1987; Claycomb & Petty, 1983).

Birkenholz and Harbstreit (1987) identified the in-service needs of beginning agricultural teachers in Missouri by prioritizing beginning teachers' in-service needs, identifying relationships that may have existed between perceived in-service needs and employment situational characteristics of beginning agricultural teachers, and by identifying activities which beginning teachers would have liked to have added or eliminated from their job responsibilities. The competencies/categories ranked as most needed included using a microcomputer in the classroom, developing skills in agribusiness and electricity, training contest teams, and assisting students with Supervised Occupational Experience Project (SOEP) records. Competencies ranked as least needed for in-service included operating audiovisual equipment, participating in vocational agriculture and other professional education activities, planning and conducting field trips, participating in civic organizations, completing reports for local administrators, and teaching day classes (Birkenholz & Harbstreit, 1987).

Completing reports for local administration as a need was ranked below the 4.0 level (Birkenholz & Harbstreit, 1987). Claycomb and Petty (1983) found Program Administration, which included local and state forms and reports, was ranked highest for all pre-service teachers and lowest for all teachers with one year of experience. "Sixty-six of the seventy-five in-service items produced responses from both extremes of the nine-point scale, indicating a wide variation among the in-service priorities of respondents" (Birkenholz and Harbstreit, 1987, p. 45). Barrick et al. (1983) indicated a wide variation among the in-service priorities of respondents, and the ranking of the topics varied significantly in a majority of aspects.

### **Needs Assessments for SBAE Teachers during the 1990's:**

We identified six needs assessments that were conducted during the 1990's that primarily focused on the in-service needs of entry-phase/beginning teachers of agriculture. Perceptions of teacher educators and state supervisors were also included during this decade (Garton & Chung, 1996). The term agriscience emerged in relation to the description of pilot agriscience courses (Newman & Johnson, 1994).

Newman and Johnson (1994) identified and assessed in-service education needs of teachers who taught pilot agriscience courses in Mississippi and determined need for additional instructional materials. In review of data from teacher perceptions of importance of and personal competence in units from agriscience courses, teachers who ranked units lower in importance also generally ranked competence level as average. Does a lower competence level in teacher's abilities influence the teacher's responses to the unit importance ranking? Teacher's unfamiliarity with technology and its capabilities were a contributing factor in the lack of technology acceptance (Garton & Chung, 1996).

Introduction to Agriscience and Agriscience I course instructors expressed an in-service need in biotechnology, computer technology, and mechanical technology. Additional materials requested for Introduction to Agriscience included computer and mechanical technology, while additional materials requested for the Agriscience I course included biotechnology, computers, and mechanical technology. Units listed as having a perceived need for in-service correlated with the additional materials requested in almost every category related to curricular needs. The most crucial in-service needs included biotechnology, computers, and mechanical/physical technology, again aligning with the materials and curricula requested by the teachers (Newman & Johnson, 1994).

Garton and Chung (1996; 1997) aimed to identify and prioritize the in-service needs of beginning agriculture teachers in Missouri. Mean weighted discrepancy scores (MWDS) are frequently used in needs assessments to prioritize and rank items (Borich, 1980). The population of interest consisted of first and second year beginning agriculture teachers and members of the Joint State Staff in Agricultural Education, which included teacher educators and state supervisors. “Twelve of the 50 professional competencies, as perceived by beginning teachers, received a MWDS greater than 4.0, indicating a greater need for in-service” (Garton & Chung, 1996, p. 54). The twelve competencies with MWDS greater than 4.0 were completing reports for local/state administrators, motivating students to learn, preparing FFA degree applications, developing an effective public relations program, preparing proficiency award applications, teaching agriscience (integrating science and agriculture), utilizing a local advisory committee, developing SAE opportunities for students, using computers in classroom teaching, supervising students’ SAE programs, teaching using experiments, and conducting local FFA chapter activities. Ten of the fifty professional competencies as perceived by beginning teachers received a MWDS less than 2.0. Areas with low priority need for in-service included teaching knowledge and skills in agricultural construction, teaching about and agriculture’s relationship with the environment, teaching knowledge and skills in the plant sciences, conducting parent/teacher conferences, using multimedia equipment in teaching, implementing VIMS in the local program, planning and conducting student field trips, developing knowledge and skills in the animal sciences, teaching knowledge and skills in soils and soil management, and teaching equine science (Garton & Chung, 1996; 1997).

In-service teachers and Joint State Staff similarly ranked effective public relations, utilizing local advisory committee, and motivating students to learn as priority areas of need. Conducting/planning field trips and teaching equine science were ranked as low priority areas of need. Findings from other research also found Joint State Staff and in-service teachers had identified similar high priority areas of need. Birkenholz and Harbstreit (1987) identified need for assistance in agricultural mechanics areas and Joint State Staff ranked repairing and reconditioning agricultural mechanics tools and equipment as a high in-service need. Some differences between Garton and Chung (1996; 1997) in-service needs and other research were observed. Joint State Staff ranked preparing agriculture contest teams as a low in-service need; however, other research ranked preparing contest teams as a high priority area of need (Birkenholz & Harbstreit, 1987; Garton & Chung 1996; 1997).

According to Garton and Chung (1996; 1997), the professional competency with the greatest need for in-service education as perceived by beginning teachers in Missouri was for completing reports for local and state administrators, which has supported the conclusions of previous research as a needed priority area of in-service professional development (Claycomb & Petty, 1983; Mundt & Connors, 1999). Mundt and Connors (1999) identified challenges associated with the first years of teaching agriculture. The top seven categories rated as very important included 1) managing the overall activities of the local FFA chapter, 2) balancing professional and personal responsibilities and maintaining personal motivation and a positive outlook, 3) building

the support of faculty, counselors, and administrators within the school system, 4) recruiting and motivating students in agricultural education, 5) using proper classroom management strategies and dealing with student discipline problems, 6) building support from parents, organizations, and adult groups within the community, and 7) properly managing time, completing paperwork, and meeting required deadlines.

Mundt and Connors (1999) also indicated motivating students in agricultural education, using proper classroom management strategies, and dealing with student discipline problems were important in-service needs. Student discipline and motivating students persisted as in-service needs in several other studies. Garton and Chung (1996; 1997) also identified an in-service need for motivating students to learn and managing student behavior problems, similarly Joint State Staff perceived managing student behavior problems as a high in-service need.

The purpose of the Edwards and Briers (1999) study conducted in Texas was to “compare the ranking of in-service needs as determined by direct assessment to a ranking based on a MWDS” (Edwards & Briers, 1999, p. 40). Motivating student learning and improving achievement was revealed as a high need and four competencies were related to facilitating positive public image (Edwards & Briers, 1999). Portraying a positive image of the agricultural education program and utilizing effective public relations have been recurring in-service needs in previous research (Claycomb & Petty, 1983; Garton & Chung, 1996; 1997). Mundt and Connors (1999) ranked building support from parents, organizations, and adult groups within the community as an important in-service need.

#### **Needs Assessments for SBAE Teachers from 2000 to 2015:**

The majority of the needs assessments for SBAE teachers identified for this review of literature were conducted during the 2000’s ( $n = 16$ ). The purpose of several needs assessments during the time period of 2000 to 2015 began to focus on the needs of more specific groups of SBAE teachers. Novice teachers/early career teachers/introductory level/beginning teachers, traditional versus alternatively certified teachers, and career phase were all introduced as populations of interest in needs assessments during the 2000’s. Emergent needs included preparing teachers for competencies related to technical skill, 21st century skills and teaching students with special needs.

Kotrlik, Redmann, Harrison and Handley (2000) aimed to determine the information technology related in-service needs of Louisiana agriscience teachers. Agriscience teachers were found to value information technology but did not have appropriate general and software specific knowledge. Knowledge, skill level, and availability of training and technology have been key factors in implementing information technology into the school systems. “In-service training is especially critical in the area of information technology because this technology changes rapidly and many experienced teachers may have very limited or no training in this area” (Kotrlik et al., 2000, p. 18). According to Kotrlik et al. (2000), no recent study had been conducted to understand the information technology needs of agriscience or vocational teachers. As mentioned previously, many other in-service research studies concluded that computer and technology use in the classroom was ranked as a high in-service need. Data “revealed that agriscience teachers placed a high value on information technology by strongly agreeing that teachers should know how to use computers and that teachers and students should have computers available for instruction” (Kotrlik, et al., 2000, p. 21).

When determining general information technology knowledge and skills possessed by Louisiana agriscience teachers, teachers did not rank themselves above average on any of the

technology that was available for the past decade and ranked themselves average or below average in all software areas. Teachers placed less confidence in information technology training offered by universities, as universities did not offer the information technology training desired by teachers, and most resorted to self-directed learning (Kotrlik et al., 2000).

Ruhland and Bremer (2002) focused on examining the professional development needs of a variety of novice secondary career and technical education (CTE) teachers “to determine if CTE teachers who entered the profession through alternative certification routes have different professional development needs than those of traditionally prepared teachers” (Ruhland & Bremer, 2002, p.18). Many times state, district, and building administrators rather than teachers made professional development decisions. Offering in-service needs to teachers should be done in an organized and effective manner that will result in an improved knowledge and competency of a skill or subject area. Ruhland and Bremer (2002) mentioned “current professional development opportunities were often unfocused, fragmented, low-intensity activities that led to no significant changes in teaching practices” (Ruhland & Bremer, 2002, p. 21). Teachers named three areas that would help improve their practice in the coming years; the most frequent responses included peer coaching and networking, up-to-date technology and computer skills, and instruction on topics including curriculum development and special populations (Ruhland & Bremer, 2002).

Layfield and Dobbins (2002) focused on the needs of beginning and experienced agriculture teachers in South Carolina. The top ten competencies needed by experienced agriculture teachers included using computers in the classroom and teaching, preparing FFA degree applications, preparing proficiency award applications, using multimedia equipment in teaching, teaching record keeping skills, developing an effective public relations program, developing SAE opportunities for students, completing reports for local/state/federal accountability, organizing a local Young Farmer Agribusiness program, and developing local adult education programs. According to Layfield and Dobbins (2002), the top ten in-service needs of beginning agriculture teachers in South Carolina proved to be similar to the needs of experienced teachers, as five of the ten competencies overlapped, including developing local adult education programs, developing SAE opportunities for students, preparing FFA degree applications, completing reports for local, state, and federal accountability, and preparing proficiency award applications. Additionally needs of beginning teachers in South Carolina included utilizing a local advisory committee, organizing fund-raising activities for the local FFA chapter, preparing agriculture/FFA contest teams, developing performance based assessment instruments, and supervising students’ SAE programs (Layfield & Dobbins, 2002).

The ten least perceived competency needs for in-service reported by experienced teachers in South Carolina included assessing and evaluating student performance, teaching skills and knowledge in plant sciences, managing student behavior problems, teaching skills/knowledge in soils and soil management, organizing fundraising activities for the local FFA chapter, relations with teachers and administration, knowledge and skills in animal sciences, planning banquets, conducting parent/teacher conferences, and planning and conducting student field trips. The ten least perceived competencies for beginning teachers included teaching agriscience (integrating science and agriculture), planning banquets, conducting parent/teacher conferences, teaching knowledge/skills in small animal care, locating and selecting student references and materials, teaching knowledge and skills in plant sciences, teaching agricultural mechanics skills, developing knowledge and skills in the animal sciences, planning and conducting student field trips, and teaching equine science (Layfield & Dobbins, 2002).

Although Joerger (2002) revealed that teachers in Minnesota have average competency in locating adequate teaching materials, Layfield and Dobbins (2002) found that beginning teachers

in South Carolina ranked locating and selecting student references and materials as a lower priority in-service need. The areas of developing knowledge and skills in plant sciences and animal sciences, conducting parent/teacher conferences, and planning and conducting student field trips were indicated as lower priority needs for in-service (Duncan et al., 2006; Joerger, 2002; Layfield & Dobbins, 2002). In a more recent study, Touchstone (2015) found funding and long-term planning and prioritization as an overall high need in Idaho.

Layfield and Dobbins (2002) found preparing FFA degree applications, organizing FFA fundraisers, and supervising SAE programs were mentioned as high priority in-service needs of South Carolina agricultural education teachers. FFA management and advising has surfaced as a high priority in-service need across many other studies (Duncan et al., 2006; Edwards & Briers, 1999; Joerger, 2002; Roberts & Dyer, 2004; Sorensen et al., 2010; Sorensen et al., 2014).

Joerger's (2002) Minnesota study revealed high need for FFA related categories, including preparing FFA degree and proficiency award applications, utilizing local FFA Alumni or Young Farmer affiliates, supervising student SAEPs, preparing agriculture/FFA career development teams, and conducting local FFA activities. Preparing FFA degree applications and proficiency applications occurred as a priority in-service need in several studies (Duncan et al., 2006; Layfield & Dobbins, 2002; Roberts & Dyer, 2004; Sorensen, Lambert, & McKim, 2014; Sorensen, Tarpley, & Warnick, 2010).

Joerger (2002) focused on identifying the "common and unique in-service needs of year 2000 and 2001 cohorts of beginning agricultural education teachers who had completed one semester of teaching" (Joerger, 2002, p. 11). Teachers ranked the perceived importance, competence, and in-service needs within the categories of teaching and classroom management, leadership and SAEP development, technical agriculture, and program design and management.

The 2001 teacher cohort indicated it was somewhat important, and the 2000 cohort believed it was of little importance to organize and conduct adult education programs (Joerger, 2002). Conducting an adult education program was also ranked as a lowest pre-service and in-service need in Georgia by Duncan et al. (2006). A difference was observed, as Layfield and Dobbins (2002) indicated developing adult education programs as a high priority perceived in-service need for both beginning and experienced teachers. Not all SBAE programs are required to offer curricula and activities for adult education and this need was specific to some states.

Trends for needs in relation to emerging agriculture technology and career awareness began to emerge during the 2000's. Christensen, Warnick, Spielmaker, Tarpley, and Straquadine (2009) and Davis and Jayaratne (2015) both mentioned emerging agriculture technology should be explored. Peake, Duncan and Ricketts (2007) revealed integrating current advances in agriculture into curriculum was the primary in-service need for Georgia teachers. Layfield and Dobbins (2002) and Joerger (2002), found trends in training needs that suggested teachers needed help with integrating science and other emerging technologies into agriculture education classes. Christensen et al. (2009) mentioned career awareness in various subjects as an emerging need.

Joerger (2002) found the 2001 cohort listed soils management and knowledge as the third highest ranked in-service need, whereas Layfield and Dobbins (2002) found experienced teachers ranked soils management and knowledge as a least preferred need. Duncan et al. (2006), and Peake et al. (2007) also ranked soils and soils management as a least preferred need.

Dormody and Torres (2002) determined perceptions among New Mexico State University pre-service agricultural education program graduates from 1990 to 2001 who were "currently

teaching agriculture on their attainment of teacher competencies and professional development activities influencing their growth on these teacher competencies since graduation” (Dormody & Torres, 2002, p. 33). Of the 28 statements, using computer technology in the classroom was the lowest competency, therefore becoming a high priority in-service need. The lack of improvement of computer competency from time of graduation to current teacher status supported computer technology as a needed area for in-service professional development. Technology also emerged as a theme within Christensen et al. (2009) as the objectives most needed for overall in-service focused on emerging agriculture technology and related careers.

Elbert and Baggett (2003) identified skills needed by secondary level agricultural teachers to assist them in working with disabled students. Areas where teachers felt the least competent included completing individual vocational education plans and individual education plans. According to the study, secondary agricultural education teachers need additional “...training to become more knowledgeable with laws that apply to special needs students” (Elbert & Baggett, 2003, p. 113).

Roberts and Dyer (2004) examined the in-service needs of alternatively certified agriculture teachers versus the needs of traditionally certified agriculture teachers. The greatest needs for traditionally certified teachers for in-service training under the FFA and SAE Supervision category included preparing proficiency award applications, preparing for career development events, and developing SAE opportunities for students. In the Instruction and Curriculum category, the greatest in-service need of alternative and traditional teachers was in changing the curriculum to meet the needs in technology. The traditionally certified teachers Program Management and Planning category indicated a high need for writing grant proposals for external funding, building the image of agriculture programs and courses, recruiting and retaining quality students and establishing a working relationship with local media. Alternatively certified teachers also indicated a high need for in-service in writing grant proposals for external funding, building the image of agriculture programs and courses, and recruiting and retaining quality students (Roberts & Dyer, 2004). Traditionally certified teachers indicated a high level of need for in-service within the Teacher Professional Development category, for managing and reducing work-related stress, time management tips and techniques, and professional growth and development, whereas, alternatively certified teachers indicated a need for training in managing and reducing work-related stress and time management tips and techniques (Roberts & Dyer, 2004).

Similar to Elbert and Baggett (2003), Duncan et al. (2006) listed teaching learning disabled students as an in-service need in the category of Teaching and Learning. Aschenbrener, Garton, and Ross (2010) also reported adapting curriculum for students with disabilities, including students with disabilities in the mainstream, keeping students on task, and working with special education teachers were of high development need. Sorensen et al. (2010) mentioned teaching students with disabilities was one of the top three highest ranked needs in Utah.

Duncan et al. (2006) “analyzed Georgia agriculture teachers’ perceived importance of and competence in, a variety of professional agricultural teaching competencies to identify their in-service needs” (Duncan et al., 2006, p. 24). The five highest-rated pre-service/in-service preparation needs for Specific/Technical Areas included integrating current advances in agriculture technology into the curriculum, teaching skills and concepts in electricity, teaching skills and concepts in small animal care and veterinary technology, teaching skills and concepts in animal biotechnology, and teaching skills and concepts in aquaculture. Peake et al. (2007) also ranked integrating current advances in agriculture technology, electricity, small animal care and veterinary technology, and concepts in biotechnology and aquaculture as needs for in-service.

Teaching skills and concepts in soils, soil management and, animal science were the lowest ranked needs (Duncan et al., 2006). Highest-ranking needs in Teaching and Learning category included motivating students to learn, teaching students to think critically and creatively, managing student behavior problems, and teaching learning-disabled students (Duncan et al., 2006). Drage (2010) also mentioned developing critical thinking and problem-solving skills in students as a needed professional development topic. Planning and conducting fieldtrips and conducting adult programs were the lowest ranked pre-service/in-service needs as perceived by teachers in the Teaching and Learning category (Duncan et al., 2006).

Sorensen et al. (2010) identified and prioritized the in-service needs of agriculture teachers in the state of Utah. The top six competencies in which in-service was needed included utilizing the community in providing opportunities for students, developing SAE opportunities for all students, preparing FFA proficiency award applications, planning and implementing student recruitment activities, teaching learning disabled students, and making repairs to equipment and tools. Several other research studies also ranked developing SAE opportunities for students as an in-service need (Duncan et al., 2006; Joerger, 2002; Layfield & Dobbins, 2002; Roberts & Dyer, 2004; Sorensen et al., 2014).

Sorensen, Lambert, and McKim (2014) identified that teachers with zero to five years of teaching experience in Oregon indicated more need in technical aspects, whereas Drage (2010) identified agriculture related to in depth study in the subject field was the lowest need among teachers in Illinois. Organizing, conducting, and maintaining adult/young farmer programs was ranked as a high priority by pre-service teachers; however, teachers with one year of experience perceived little assistance was needed in this area. Drage (2010) discovered a professional development need for expanding the use of technology for instruction, as all content area teachers within a CTE study ranked this topic highest.

The competencies recurring with the least need included how to set up a meeting room, conducting parent/teacher conferences, explaining the history and organization of FFA and FFA degree areas, explaining proper dress/characteristics of a good FFA leader, and planning/organizing a FFA meeting. Conducting parent/teacher conferences was a low priority need in studies conducted in Georgia, Minnesota, and South Carolina (Duncan et al., 2006; Joerger, 2002; Layfield & Dobbins, 2002).

Planning and organizing FFA fundraisers and planning FFA banquets were found as least preferred in-service needs of experienced South Carolina teachers (Layfield & Dobbins, 2002). Organizing fundraising activities ranked as the third highest in-service need for South Carolina beginning teachers, which indicated a difference between in-service needs according to beginning and experienced teachers (Layfield & Dobbins, 2002). Aligned with Layfield and Dobbins (2002) beginning teacher's needs, Touchstone's (2015) needs assessment also ranked funding as a high overall need. Support from the school administration to understand the SBAE program also surfaced as an area of need in Idaho (Touchstone, 2015).

### **Findings**

As previously noted, an integrative literature review includes both a critique of the literature and a synthesis of the various studies (Torraco, 2005), and our intent was to provide a background of literature organized chronologically over three decades (32 years) from 1983 to 2015. The aforementioned review of literature first served to provide an overview of needs assessments that were conducted during each decade and secondly served as the data synthesized to provide the following findings. The findings of this synthesis were based on identifying the key

recurring competencies/categories of need identified for each needs assessment examined to provide a summary of the competencies/categories identified by decade to illustrate potential change over time. Administering teacher needs assessments can prove to be a valuable tool to collect teacher input and determine priority area needs for teacher professional development to assist in pinpointing the content focus.

In response to our research question, have the needs of agricultural education teachers remained the same or changed over time, we found that some change in need for teacher professional development has occurred over time with new competencies/categories emerging, while some needs have persisted. The meta-analytical approach used to conduct this synthesis revealed some inconsistent results due to the variation of instruments used to collect data however, many competencies revealed cohesive responses. Table 1 outlines a summary of the recurring SBAE teachers' perceived needs throughout the three decades (1983-2015). The pre-determined themes (FFA, Program, SAE, and Skills) were chosen to align with the 3-circle model of the SBAE program.

Table 1

*Competencies/Categories of Need Revealed Through A Synthesis of Research Conducted on Needs Assessments for SBAE Teachers Over Three Decades from 1983 To 2015*

Theme	Needed Competency/Category	DECADE		
		1980s	1990s	2000s
*FFA	Program Management	X	X	X
FFA	Preparing Degree Applications		X	
FFA	Preparing Proficiency Awards		X	
FFA	Training Contest Teams	X		X
Program	Adult Education Program	X		
*Program	Developing PR Programs	X	X	X
*Program	General Administrative Tasks	X	X	X
^Program	Funding/Fundraising			X
Program	Instructional Materials		X	
^Program	Utilizing an advisory committee		X	X
*SAE	SAE Development/Supervision	X	X	X
Skill	Agribusiness and Electricity	X		
Skill	Bio and Mechanical Technology		X	
*Skill	Computer Technology	X	X	X
Skill	Managing Student Behavior	X	X	X
Skill	Teaching Agriscience		X	X
Skill	Time Management		X	
^Skill	21st Century Competencies			X
^Skill	Working with Special Needs			X
Skill	Work/Life Balance		X	

Note: X signifies research studies revealed a need for the given competency/category within the decade, \* signifies cohesive competency/category revealed in all three decades, ^ signifies emerging competency/category of need.

The synthesis of data collected through three decades of SBAE needs assessment research confirmed that competency levels and priority areas of needs are diverse and somewhat inconsistent depending on the level of teaching experience (pre-service, novice, or experienced/senior teachers) and type of teacher certification (traditional or alternatively certified teachers). A contrast in needs was found among the competency areas, some of which included completing reports and forms, managing student behavior problems, preparing contest teams, locating adequate teaching materials, and conducting adult education programs (Aschenbrener et al., 2010; Birkenholz & Harbstreit, 1987; Claycomb & Petty, 1983; Drage, 2010; Duncan et al., 2006; Edwards & Briers, 1999; Garton & Chung, 1996; 1997; Joerger, 2002; Layfield & Dobbins, 2002; Mundt & Connors, 1999; Roberts & Dyer, 2004; Sorensen et al., 2010; Sorensen et al., 2014; Touchstone, 2015).

Interestingly, technical agriculture competence was found to be a low priority in-service need compared to program design and management and other categories related to managing the FFA component of the SBAE program (Claycomb & Petty, 1983; Garton & Chung, 1996; 1997; Joerger, 2002; Roberts & Dyer, 2004). For example, Roberts and Dyer (2004) revealed traditionally and alternatively certified teacher's in Florida ranked technical agriculture as a low perceived need. However, Peake et al. (2007) reported Georgia teachers viewed all technical competencies to be somewhat important or important. The term agriscience emerged in the 1990's and technical agriculture competence in biotechnology and mechanical technology also surfaced (Newman & Johnson, 1994).

Technology and computer use in the classroom became a major competency area in which a majority of the findings over three decades collectively indicated a priority need for in-service professional development existed. Teachers have requested computers as additional equipment required for the teaching of agriscience courses and have also noted an absence of appropriate, general and software specific knowledge in information technology (Kotrlik et al., 2000; Newman & Johnson, 1994). We acknowledged that since these studies were conducted computers and technology have become more readily available for use by teachers in their classrooms and laboratories, but the need for computer technology still persisted into the 2000's.

Portraying a positive image of the agricultural education program and utilizing effective public relations was another competency cohesively needed throughout all three decades (Claycomb & Petty, 1983; Dormody & Torres, 2002; Duncan et al., 2006; Edwards & Briers, 1999; Garton & Chung, 1996; 1997; Joerger, 2002; Layfield & Dobbins, 2002; Mundt & Connors, 1999; Roberts & Dyer, 2004; Sorensen et al., 2010; Sorensen et al., 2014; Touchstone, 2015). During the late 1990's and early 2000's another perceived need for in-service that surfaced was FFA management and advising, particularly in preparing FFA degree and proficiency award applications (Duncan et al., 2006; Edwards & Briers, 1999; Garton & Chung, 1996; 1997; Joerger, 2002; Layfield & Dobbins, 2002; Mundt & Connors, 1999; Roberts & Dyer, 2004; Sorensen et al., 2010; Sorensen et al., 2014).

Providing support for special needs education services may be an emerging 21<sup>st</sup> century priority need for agricultural education and CTE teachers (Aschenbrener et al., 2010; Drage, 2010; Duncan et al., 2006; Elbert & Baggett, 2003; Roberts & Dyer, 2004; Ruhland & Bremer, 2002; Sorensen et al., 2010; Touchstone, 2015). Many CTE programs are recognized as hands-on and have provided experiential learning opportunities for students with special needs. An increasing

population of special needs students in CTE programs has required specialized training for teachers to be better prepared to differentiate instruction for diverse learners (Tomlinson, 2014).

### **Conclusions, Implications, and Recommendations**

As suggested by Kovar and Ball (2013), we examined the findings of the review to guide or propose how in-service programs for agricultural education teachers could be developed. A total of 24 published (1983 - 2015) needs assessments for agricultural education teachers that were conducted in 16 states were synthesized. As a result of this review of literature across three decades of studies, four pre-determined categories for area of need (FFA, Program, SAE, and Skill) were focused upon. Within those four areas, six major competencies consistently recurred during the 32 year time period from 1983 to 2015 which included FFA program management, developing public relations programs, program administration/general administrative tasks, SAE development/supervision, managing student behavior, and computer technology. During the 1990's preparing FFA degree applications and proficiency awards, instructional materials, teaching agriscience, biotechnology and mechanical technology, time management and work/life balance were revealed as categories of need among SBAE teachers. Funding/fundraising, utilizing local advisory committees, 21st century competencies, and working with special needs were four new areas of need that emerged from 2000 to 2015.

During the 1990's the summary of findings indicated less emphasis needed to be placed on technical agriculture skills. We believe the lack of focus on technical agriculture skills may be directly related to the variety of instruments used. The various categories included among the needs assessment instruments administered during 1983 – 2015 tended to discern need for specific skills or programmatic needs. Relevantly our findings directed us back to the question "how do we determine which areas of knowledge are most essential for teachers"? Applying Desimone's (2009) framework and our intended purpose to determine if needs have changed over time, topics related to technical skill emerged in the 2000's. Perhaps an emphasis on content focus should be examined as a future professional development model in agricultural education. Inconsistency among SBAE teachers' responses for needs assessment categories were found in all three decades, with notable differences between beginning and experienced teachers emerging.

The AAAE research agenda encourages synthesis of past research to identify gaps and provide guidance for future researchers to address the priorities of the agenda (Roberts, Harder, & Brashears, 2016). Identification of common needs for agriculture teachers, will better equip the professional workforce to educate and prepare future agriculture leaders. Therefore, we make the following recommendations for research focused on needs assessments of SBAE/CTE teachers.

Over the past three decades professional development needs have varied dependent upon the types and experience level of the teachers. It is therefore recommended that a variety of professional development opportunities be designed and provided for agricultural education teachers dependent upon their level of experience. As indicated in Desimone's (2009) conceptual framework, the core features of professional development suggest content focus, active learning, coherence, duration, and collective participation are required to increase teacher knowledge, skills, or change in attitude. Teacher educators should plan experiences that follow the core features and relate to a variety of audiences, dependent upon career stage and type of certification. We recommend emphasis be placed on content focus for SBAE teachers.

The National Association of Agricultural Educators (NAAE) has already begun to conduct focused in-service training for various levels of experience for agricultural education teachers that include pre-service, early and mid-career levels. Hopefully the NAAE has considered professional

development for teachers at a variety of levels of experience based upon the recommendations from needs assessment research that has been conducted in those areas. We recommend continuation and expansion of these types of teacher professional development programs. We also recommend these programs consider the synthesis of this review of literature to help categorize and prioritize future professional development.

As previously recommended, “researchers should analyze data to identify national trends in agricultural education” (Duncan et al., 2006, p. 33); our efforts pursued this advice and we further recommend teacher needs assessment studies be conducted on a continual basis, within states and among regions, taking into account the variation of need between experienced and beginning teachers. Identifying national trends in agricultural education will prove beneficial to determine the direction of the program and further address in-service needs and potentially provide guidance for agricultural education teacher preparation programs (Duncan et al., 2006).

We further recommend open communication among teacher education programs, teacher educators, school administration and in-service teachers occur to determine, design, and provide relevant curricula and in-service opportunities while also identifying national trends among in-service needs assessments. Specifically, utilizing an advisory program and developing support for an effective public relations program should be further researched as a priority need for SBAE teachers. The guidance of an advisory committee can assist in developing an effective public relations program to assist SBAE teachers in gaining the direction and support needed for their programs that will reflect the industry needs of the 21st century. Utilization of the recommendations from an advisory board may also assist in aligning support for the development and focus of 21st century competencies and special needs which have emerged. Additionally, in a world where technology continues to advance at a more rapid pace than we seem to be prepared to teach, we recommend advancement of technology as an important area for further research.

Knowledge in teaching students with special needs emerged as a priority area of need in the 2000’s. Career awareness and the utilization of Science, Technology, Engineering, and Math (STEM) also began to emerge in the 2000’s, but surprisingly only surfaced in two of the studies we analyzed. Programs of in-service education and additional research should be based on the findings of this literature review (Torraco, 2005). Finally, it is recommended that states conduct an analysis of the curricula currently being taught in teacher preparation programs to determine if courses and content align with the current needs of pre-service agricultural education teachers and match the content standards outlined for the SBAE programs in their state.

Although many of the instruments used to gather data in the studies conducted from 1983 to 2015 were similar, there was little consistency and many discrepancies among the factors included for data collection. We recommend development of a cohesive and consistent instrument to be utilized nationwide to assist in better determining the professional development needs for a variety of agricultural education teachers, which should include pre-service, novice, experienced, traditionally, and alternatively certified teachers. The context of the instrument and subsequent professional development models should reflect the conceptual framework for studying the resulting effects on teachers (Desimone, 2009).

In summary, by providing a synthesis of past research conducted in the area of needs assessments for SBAE teachers, we hoped to provide an overview and synopsis of what was revealed from the past. For the progression of future research to be conducted, in what we believe to be a rather important area for continued professional development, we provided direction and emphasized the need for content focus.

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