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Examining the Professional, Technical, and General Knowledge Competencies Needed by Beginning School-Based Agricultural Education Teachers

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The philosophy behind the kind of teacher education one receives affects the preparedness of beginning agricultural education teachers. The purpose of this philosophical study was to examine and summarize the professional knowledge, technical knowledge, and general knowledge competencies needed in a comprehensive teacher education program to prepare beginning school-based agricultural education teachers. Sixteen professional knowledge competencies, three technical knowledge competencies, and 16 general knowledge competencies were derived from the literature. The authors hope the competencies complied in this inquiry will spur philosophical discussions regarding the coursework and experiences provided by an agricultural teacher education program.

Keywords: teacher education; professional knowledge; technical knowledge; general knowledge

> At best, a philosophy for teacher education in agriculture is a framework for thinking about, and acting on, the goals and the ends-means relationships in agricultural education. It is a framework derived from, and continuously influenced by, standards and values which are formed by inquiry, inquiry which leads to empirical verification and consistency with reality. Philosophy, therefore, is at the heart of the enterprise. It requires a consideration of the destiny of individuals, groups, and society itself. It is concerned, therefore, with the concept of destination (ends) and the appropriate choice of routes (means) which may be available, or which may be made available. (Swanson, 1982, p. 298)

As described by Swanson (1982), philosophy is at the heart of agriculture teacher education, and the philosophy behind the kind of teacher education one receives affects the preparedness of beginning teachers (Darling-Hammond, 2006). Therefore, based on Darling-Hammond's (2006) extensive research in teacher education, philosophical decisions made in preservice agricultural teacher education should, theoretically, influence beginning school-based agricultural education teachers' effectiveness and success.

With that influence in mind, what should preservice agricultural education teachers learn during a baccalaureate agricultural teacher education program, and what should they be able to do as a result of completing a baccalaureate agricultural teacher education program? The answers to these questions encompass the essential professional knowledge, technical knowledge, and general knowledge competencies that should be included in a baccalaureate agricultural teacher education program. This study will seek to answer the aforementioned questions and address priority five (efficient and effective agricultural education programs) of the American Association for Agricultural Education's national research agenda (Doerfert, 2011).

Purpose

The purpose of this philosophical study was to examine and summarize the professional knowledge, technical knowledge, and general knowledge competencies needed in a comprehensive teacher education program to prepare beginning school-based agricultural education teachers. This paper provides an overview of

relevant literature and outlines the professional knowledge, technical knowledge (the content area), and general knowledge competencies that are required to sufficiently prepare beginning school-based agricultural teachers. The authors believe that a teacher education *program* is more than what is generally referred to as teacher *preparation*, the courses taught and experiences provided within agricultural education. The paper is not intended to include a comprehensive historical review of preservice agricultural teacher education. Rather, the authors hope this article will spur dialogue and research aimed at identifying a vision of what agricultural teacher education should encompass at the baccalaureate level and further develop the knowledge base for teaching school-based agricultural education.

Methodology

The researchers began the preparation of this philosophical paper by reviewing in-depth the only two textbooks written to address teacher education in agriculture: the book edited by Berkey in 1982, and the book edited by Torres, Kitchel and Ball in 2010. In addition, a review of the *Journal of Agricultural Education* was conducted to locate sources of relevant research and writing. Other primary sources were the works of Darling-Hammond and Cruickshank. As is important in philosophical argument, recent literature must be examined within the context of more historical writing. The Berkey books serves as a point of departure for discussions within agriculture teacher education. Finally, commonly accepted standards were reviewed, including the National Council for Accreditation of Teacher Education (NCATE) and the National Standards for Teacher Education in Agriculture.

Overview of Literature and Outline of Knowledge Competencies

The following sections provide an overview of literature related to each component of an agriculture teacher education program, followed by a summary of the competencies needed in each (professional knowledge, technical knowledge, and general knowledge).

Professional Knowledge

Beginning teachers should "start their careers with a background of experiences that allows them to handle classroom situations comfortably" (National Education Association as cited in Cruickshank, 1985, p. 27). In response to the National Education Association report, Cruickshank (1985) posited that the "most serious obstacle preventing teaching from having true professional status is the lack of consensus among educators regarding what constitutes the requisite specialized body of knowledge and skills for effective teaching" (p. 14) and thus called for the professionalization of teacher education. One would be hard pressed to argue with the National Education Association's statement and with Cruickshank's call for a distinct body of knowledge for preparing teachers. Therefore, what are the experiences and knowledge that a preservice teacher should have to successfully lead a classroom of students with a variety of backgrounds, experiences, and different preferred ways of learning? Are those experiences different for preservice agricultural education teachers?

To Cruickshank (1985) professional knowledge in education was the "pedagogy or the art and science of teaching" (p. 4); however, in 1996, Cruickshank et al. divided his conceptualization of professional knowledge or pedagogy into educational knowledge and educational skills. In addition, Cruickshank (1985) noted that the NCATE Standards of 1982 stated that the professional curriculum for preparing teachers should be discernible from the general education curriculum and the professional curriculum should be comprised of the following four categories: "1) content for teaching specialty, 2) humanistic and behavioral studies, 3) teaching and learning theory, and 4) practicum." (p. 17). Content for the teaching specialty is knowledge of subject matter and the curriculum of the subject matter; humanistic and behavior studies is the foundational studies of education and in education; teaching and learning theory is study of the knowledge base of teaching and learning; practicums are experiences related to teaching in real and artificial classrooms such as observations, part-time participations, and apprenticeships (Cruickshank, 1985).

In *How People Learn: Brain, Mind, Experience, and School*, Bransford, Brown, and Cocking (2000) purported that, in addition to subject matter and pedagogical knowledge, teachers need an understanding of how to teach specific subject matter (pedagogical content knowledge) to be more effective and that they should possess a general understanding of learners.

> Pedagogical content knowledge is different from knowledge of general teaching methods. Expert teachers know the structure of their disciplines, and this knowledge provides them with cognitive roadmaps that guide the assignments they give students, the assessments they use to gauge students' progress, and the questions they ask in the give and take of classroom life. (Bransford, Brown, & Cocking, 2000, p. 155)

Additionally, Bransford et al. stated that pedagogical content knowledge allows a teacher to understand the aspects of the subject matter that can be grasped easily or may prove more challenging for the learner; without pedagogical content knowledge teachers rely on others for information related to how to organize the curriculum. Thus, according to Bransford et al. (2000), pedagogical content knowledge is an "extremely important part of what teachers need to learn" (p. 45).

Similarly, the NCATE Standards of 2008 purported teachers should possess "pedagogical content knowledge and skills, pedagogical and professional knowledge and skills, and professional dispositions necessary to help all students learn" (p. 12). More specifically, teachers should possess knowledge in the following: (a) how school, family, and community context influence learning; (b) instructional strategies; (c) assessment strategies and analysis of student learning; (d) how students learn and develop; (e) the relationship between content and content-specific pedagogy; (f) how to effectively integrate technology into instruction and curriculum; (g) how to use educational research to inform practice; and (h) how to contribute to professional communities.

In an attempt to provide the teaching profession with a conceptual framework of the knowledge base for teaching, Darling-Hammond and Bransford (2005) introduced their conceptual framework for effective teaching and learning (Figure 1). Darling-Hammond and Bransford also professed that effective teachers needed more than subject matter knowledge and general pedagogy. Their framework proposed that teaching is a professional endeavor that prepares learners to participate in our democratic society. The framework also proposed the following three areas of knowledge as essential for teaching:

- knowledge of learners and how they learn and develop within social context;
- conceptions of curriculum content and goals: an understanding of the subject matter and skills to be taught in light of the social purpose of education; and
- an understanding of teaching in light of the content and learners to be taught, as informed by assessment and supported by classroom environments. (Darling-Hammond & Bransford, 2005, p. 11)

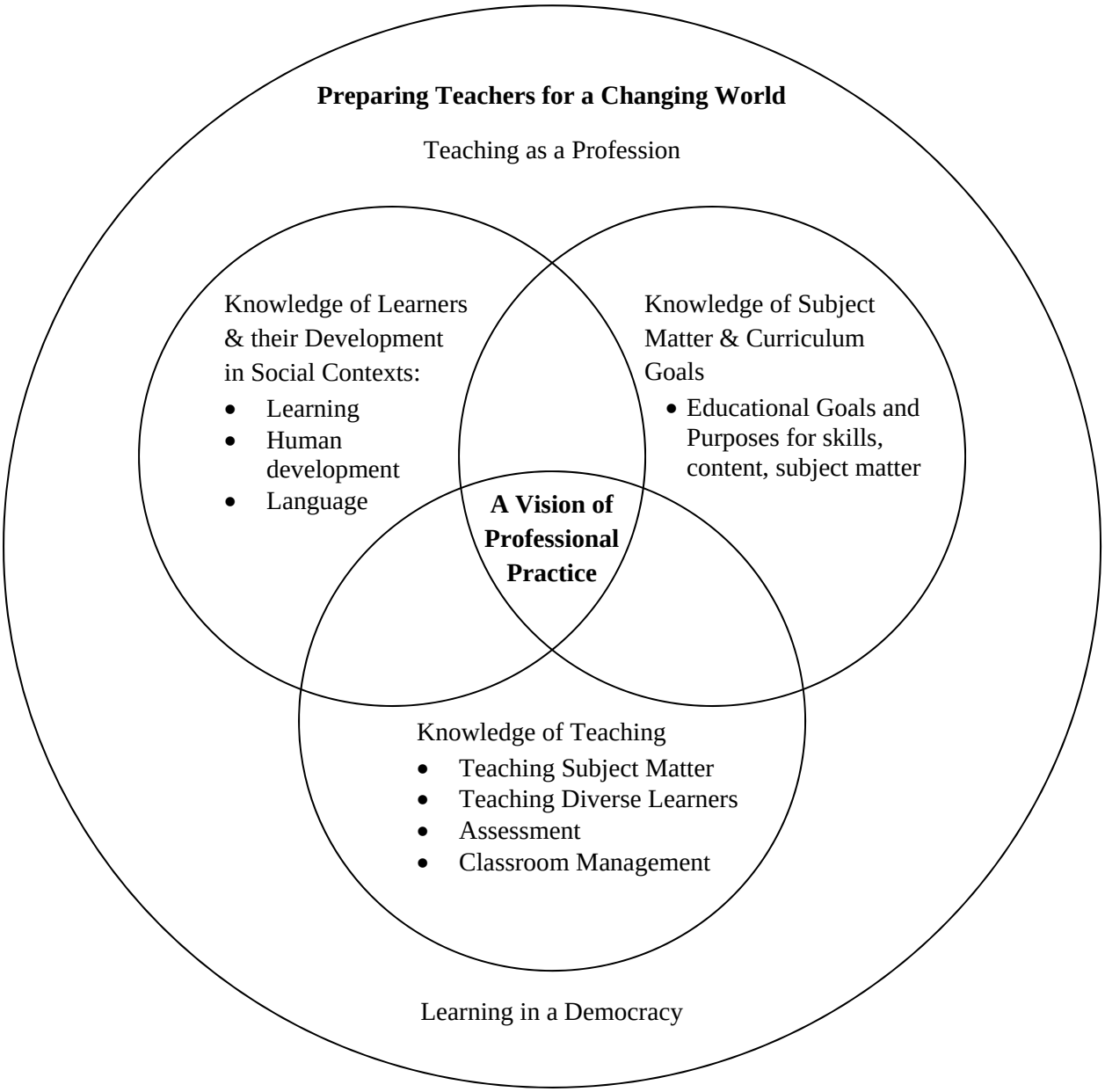

Figure 1. A Framework for Understanding Teaching and Learning (Darling–Hammond & Bransford, 2005, p. 11).

Darling-Hammond (2006) studied exemplary teacher education programs and found that the teacher education programs conceptualized professional teaching knowledge in similar ways.

- They emphasized understanding *learners and learning* as central to making sound teaching decisions (p. 81).
- They understand that the *subject matters* (p. 81).
- They unite the study of subject matter and children in the analysis and design of *curriculum* (p. 82).
- They see learners, subject matter, and curriculum as existing in a *sociocultural context* that influences what is valued and how learning occurs (p. 82).
- They seek to develop a *repertoire of teaching strategies* (p. 82).
- They place extraordinary emphasis on the process of *assessment and feedback* as essential to both student and teacher learning (p. 82).
- They seek to develop teachers' abilities as *reflective decision makers* who can carefully observe, inquire, diagnose, design, and evaluate learning and teaching so that it is continually revised to become more effective (p. 83).
- They see teaching as a *collaborative activity* conducted within a *professional community* that feeds ongoing teacher learning, problem solving, and the development of ever more sophisticated practice (p. 83).

Darling-Hammond (2006) stated that the conceptualization of teaching knowledge that resulted from the study of exemplary teacher education programs was consistent with the conceptual framework for understanding teaching and learning offered by Darling-Hammond and Bransford (2005).

Specific to agricultural teacher education, Crunkilton and Hemp (1982) suggested that the professional training of agricultural teachers should consist of "professional knowledge, professional attitudes, and professional skills" (p. 139). Also, Crunkilton and Hemp stated that an undergraduate agricultural teacher education program "must provide the pedagogical competencies needed by beginning teachers to conduct a local agricultural education program successfully" (p. 135) and should develop a theoretical understanding of educational processes to be a professional teacher. Similar to Bransford et al. (2000), Darling-Hammond (2006), and Darling-Hammond and Bransford (2005), Barrick and Garton (2010) professed that subject matter knowledge alone is not sufficient for the effective teaching of agriculture. Preservice teachers are expected to acquire knowledge and skills related to teaching that allows their students to learn and understand the subject matter of agriculture (Barrick & Garton, 2010). To that end, Roberts and Kitchel (2010) indicated that pedagogical knowledge and pedagogical content knowledge are types of knowledge needed for teaching agriculture, and the American Association for Agricultural Education's (2001) national standards for agricultural education indicated that teachers should complete pedagogical and professional studies that foster pedagogical and professional knowledge for instructing all students.

Professional Knowledge Competencies Derived From the Literature

Based on the literature discussed above, the competencies presented in Table 1 are essential professional knowledge competencies needed for teaching.

Table 1

Essential professional knowledge competencies for beginning teachers

Professional knowledge competency	Author(s)
Pedagogical knowledge	Barrick & Garton, 2010; Bransford et al., 2000; Cruickshank, 1985; Crunkilton & Hemp, 1982; Darling-Hammond, 2006; Darling-Hammond & Bransford, 2005; NCATE, 2008; Roberts & Kitchel, 2010
Pedagogical content knowledge	Bransford et al., 2000; Darling-Hammond, 2006; Darling-Hammond & Bransford, 2005; NCATE, 2008; Roberts & Kitchel, 2010
Understanding of learners and learning o "Deep understanding of human development and learning, how people develop and learn in distinctive social context, and how some develop and learn in exceptional ways" (Darling-Hammond, 2006, p. 81)	Bransford et al., 2000; Darling-Hammond, 2006; NCATE, 2008
Ability to utilize a wide-range of teaching strategies for particular purposes and students	Darling-Hammond, 2006; NCATE, 2008
Ability to plan curriculum beyond an individual lesson and the ability to define and defend the educational goals they choose; curricular vision o "Consideration of educational goals and purposes in general and within content areas, including review of national and state learning and teaching standards and practices with how to embody them in curriculum; learning about instructional design, including guided practice in developing, implementing and reflecting on and revising curriculum plans; and review and evaluation of curriculum plans and materials from the perspectives of instructional design, evaluation of the implementation of others' curriculum efforts, and study of research on curriculum and its implementation" (p. 191) o	Darling-Hammond & Bransford, 2005
Understand that "curriculum is not static, but is continuously negotiated" (p. 172)	Darling-Hammond & Bransford, 2005

Table 1 Continues

Table 1 Continued

Professional knowledge competency	Author(s)
Ability to design curriculum and tailor instruction based on the subject matter, the learners, and purposes of education	Darling-Hammond, 2006
Understand how instructional goals are related to assignments and assessments	Darling-Hammond & Bransford, 2005
Ability to develop appropriate assignments and assessments and then utilize the information gained to influence instruction and student learning	Darling-Hammond, 2006; NCATE, 2008
Ability to be a reflective decision maker o "Carefully observe, inquire, diagnose, design, and evaluate learning and teaching so that it is continually revised to become more effective" (Darling-Hammond, 2006, p. 83) o "Diagnosticians and planners who know a great deal about the learning process and have a repertoire of tools at their disposal" (Darling-Hammond, 2006, p.80)	Darling-Hammond, 2006; NCATE, 2008
Ability to be a contributing member of a professional community and view teaching as a collaborative activity	Darling-Hammond, 2006; NCATE, 2008
Knowledge and skills related to effective classroom management	Darling-Hammond & Bransford, 2005
Ability to see "learners, subject matter, and curriculum as existing in a sociocultural context that influences what is valued and how learning occurs" (Darling-Hammond, 2006, p. 82).	Darling-Hammond, 2006; NCATE, 2008
Understand how to effectively integrate technology into instruction and curriculum	Darling-Hammond & Bransford, 2005; NCATE, 2008
Understand how to use educational research to inform practice	Darling-Hammond & Bransford, 2005; NCATE, 2008
Knowledge and understanding of how to plan and manage an agricultural education program	Crunkilton & Hemp, 1982

Technical Knowledge/Content Knowledge

"To argue that teachers need to know the subject they teach seems almost tautological, for how can we teach what we do not understand ourselves" (Darling-Hammond & Bransford, 2005, p. 205)? Likewise, Roberts and Dyer (2004) purported that effective agricultural teachers have an "excellent knowledge of the subject matter" (p. 92). One would be hard pressed to argue with the quotes above; however, there is not a consensus in the agricultural education literature on the technical knowledge/content area competencies required for beginning school-based agricultural education teachers to be successful. The authors recognize that the technical agricultural competencies needed may vary among different school-based agricultural education programs; however, the authors believe it is important to have a philosophical discussion related to *core* technical agricultural competencies needed by beginning agricultural education teachers.

With that in mind, the American Association for Agricultural Education's (2001) national standards for agricultural education suggested that one-third of the agricultural teacher education preparation coursework should consist of technical content and be designed so that preservice teachers attain competence in basic principles, concepts, and experiential practices in agricultural science and natural resources related to:

A. Business, Management, and Economic Systems
B. Agricultural and Mechanical Systems
C. Plant, Animal, and Food Systems
D. Natural Resources and Environmental Systems

with proficiency or advanced competence in at least one of the areas. (pp. 3-4) Correspondingly, Connors and Mundt (2001) found in a survey of 61 agricultural teacher education programs that technical agriculture coursework comprised approximately one-third of the teacher education programs' coursework, but specific technical agricultural competences were not identified. Myers and Dyer (2004) advocated that research was needed to determine the most effective percentage of a teacher preparation program that should be dedicated to technical knowledge coursework.

In 1982, McCracken stated that agricultural experiences that were previously considered as prerequisites to entering a teacher education program such as farm and practical agricultural experiences "must now be provided within the preservice curriculum" (p. 121), because fewer undergraduate students have an agriculture background. Anecdotally, this also seems to be true of today's agricultural education preservice teachers, and in a qualitative study by Shelley-Tolbert, Conroy, and Dailey (2000), university faculty and staff present at the 1999 National FFA Convention also professed that preservice teachers are less familiar with agriculture and many do not have experiences in FFA as compared to preservice teachers of the past.

Additionally, McCracken (1982) called for agricultural teachers to be prepared as specialists in a technical agricultural content area with a general knowledge of agriculture versus being prepared as agricultural generalists because of the loss of commonality among the different agricultural technical content areas. He cited that the loss of commonality was due to the shift in agriculture from general crop and livestock farms to specialized farms and jobs within agricultural industries, thus reducing the breadth of technical competencies required of an agricultural workforce. The standards for quality programs identified the following technical agricultural content areas: (a) agricultural engineering and mechanics, (b) plant and soil science, (c) animal science, and (d) agricultural economics and business management (McCracken, 1982). Furthermore, the standards identified the following specialty agricultural content areas: (a) ornamental horticulture, (b) agricultural products processing, (c) forestry, and (d) natural resources (McCracken, 1982). Moreover, McCracken (1982) purported that technical agricultural knowledge preparation should have "priority over general education and professional education in the allocation of credit-hours in the curriculum of the prospective teacher" (p. 133). McCracken hypothesized that as technical competence increased a teacher could succeed with less professional competence. The authors feel that they should note that they do not agree with

McCracken's assertion that technical knowledge coursework should take priority over professional education coursework. The authors believe they are equally valuable.

Similar to McCracken (1982), Edwards and Thompson (2010) noted that the technical knowledge competencies needed for teaching school-based agricultural education have changed over time. However, Edwards and Thompson stated that the technical knowledge competencies needed have evolved from knowledge and skills in specific careers to a broad knowledge and skill base for career clusters or groups of related agricultural industries. Therefore, today's agricultural preservice teachers need a broader understanding of agriculture and career skills. In regard to how the knowledge and skills are typically obtained, Edwards and Thompson (2010) noted:

> Frequently, the acquisition of technical competence has meant that preservice students complete required coursework that includes introductory or survey courses in the animal sciences, plant and soil sciences, mechanized agriculture (or agricultural systems technology), agricultural economics, and natural resources. In addition, some upper-division or advanced coursework is required in those or related subject areas…. At some institutions, requirements also involve coursework – introductory and/or advanced – in horticulture, agricultural communications, and agricultural leadership. (pp. 114-116)

In addition to the technical knowledge courses mentioned above, having an understanding of the science of agriculture is also an important technical knowledge competency for preservice teachers to possess (Edwards & Thompson, 2010).

This view is also supported by Barrick (2012), Conroy, Trumbull, and Johnson (1999), and Stripling (2012) who stated that agriculture is a science and that the science (Barrick, 2012) and core academics (Conroy, Trumbull, & Johnson, 1999; Myer & Dyer, 2004; Stripling, 2012) in agriculture should be emphasized. Barrick (2012) indicated that his high school rural science teacher, "Mr. Stimpert[,] knew that students who were interested in agriculture as a career but were also college–bound needed and wanted the science of agriculture as much as or more than the vocational aspect of the program" (p. 1). In addition, Barrick postulated that the vocational aspects of agriculture "simply tell us what to do…. The science aspect tells us why we do it that way" (p. 2). Correspondingly, Phipps, Osborne, Dyer, and Ball (2008) stated that teaching agriscience involves understanding the science behind agricultural practices and "asking and investigating 'why' questions that support agricultural practices" (p. 337). This philosophy is also consistent with Roberts and Ball (2009), who posited that school-based agricultural education today utilizes agriculture as a content and context for learning (Figure 2) in which agricultural content and knowledge from other domains are taught.

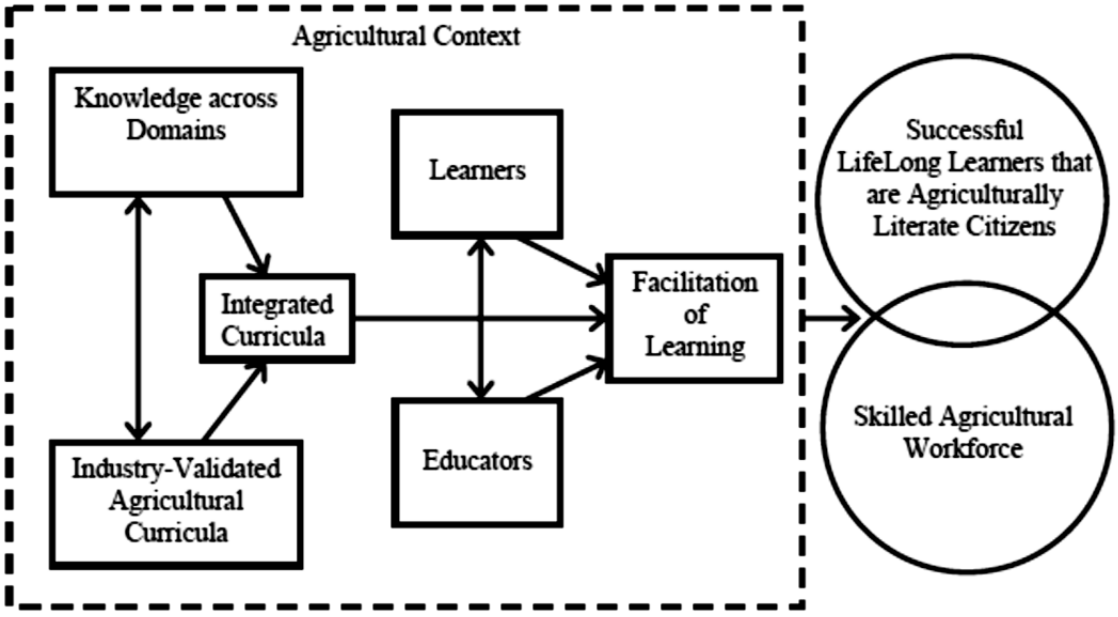

Figure 2. Conceptual model for agricultural subject matter as a content and context for teaching (Roberts & Ball, 2009, p. 87).

Technical Knowledge/Content Knowledge Competencies Derived From the Literature

Based on the literature above, one could argue that the competencies presented in Table 2 are essential technical knowledge/content area competencies needed by beginning school-based agricultural teachers.

Table 2

Essential technical knowledge/content knowledge competencies for beginning teachers

Technical knowledge/content knowledge competencies	Author(s)
Broad knowledge of agricultural content areas	American Association for Agricultural Education, 2001; Edwards & Thompson, 2010
Knowledge and skills related to the science of agriculture	Barrick, 2012; Conroy et al., 1999; Edwards & Thompson, 2010; Myer & Dyer, 2004; Phipps et al., 2008; Roberts & Ball, 2009; Stripling, 2012
Knowledge and skills related to the traditional academic areas found naturally in agriculture	Barrick, 2012; Conroy et al., 1999; Edwards & Thompson, 2010; Myer & Dyer, 2004; Phipps et al., 2008; Roberts & Ball, 2009; Stripling, 2012

General Knowledge

"Educating the person as a human must remain the forerunner to educating the person as an agriculturalist" (Barrick, 1989, p. 27). Then, "what should an educated person know?" (Cheney, 1992, p. 30). A university's general education requirements may reflect what a university sees as the answer. General education is "purported to be of value to all persons"

(Cruickshank, 1985, p. 4) and is not intended to prepare the learner for a specific job or career. Cruickshank (1985) posited that in light of Dewey's *Democracy and Education*, general education should focus on living in a democratic society. Similarly, the Harvard Committee on General Education (as cited in Cruickshank, 1985), stated that general education was the

> means of preparing an individual to be a free person and citizen. It was an education designed to give a person the capacity to examine his or her life, a sense of inner freedom, and a broad outlook in order to overcome provincialism. (p. 5)

Correspondingly, Miller (1992) purported that "the purpose of general education is to develop the student's ability to function effectively in society – as an individual, as a family and community member, and as a professional" (p. 73). In regard to teachers, Cruickshank (1985) stated that there is an expectation that teachers need a broad general education for the following reasons: (a) general education enhances their teaching, (b) teachers are responsible for educating our youth, and (c) teachers are models of educated individuals. Supporting Cruickshank, NCATE (2008) indicated that a broad liberal arts education was needed in a teacher preparation curriculum. In agricultural teacher preparation, general education comprises approximately one-third of the curriculum, but research is needed to determine the best configuration of coursework (Myers & Dyer, 2004). Therefore, this section will seek to answer the question – what are the essential general knowledge competencies needed by beginning school-based agricultural education teachers to teach?

Adler (2009) posited that general education in K-12 schools should include knowledge in three areas – (a) language, literature, and the fine arts; (b) mathematics and natural sciences; and (c) history, geography, and social studies. Furthermore, Adler professed that those areas of knowledge are fundamental and all educated people should be familiar with them. In 1978, Harvard University proposed five academic areas of general education (a) literature and the arts, (b) history, (c) social and philosophical analysis, (d) science and mathematics, and (e) foreign culture (Seligman & Malamud as cited in Cruickshank, 1985). Conant (1963) recommended that general education for teachers should comprise approximately one-half of the curriculum and include the following subjects: (a) English and composition, (b) western world's literary tradition, (c) history, (d) art and music appreciation, (e) mathematics, (f) science, (g) general psychology, (h) sociology and anthropology, (i) philosophy, (j) economics, and (k) political science. Miller (1988) suggested that general education should develop

> in individual students the attitude of inquiry, the skills of problem solving, the individual and community values associated with a democratic society, and the knowledge needed to apply these attitudes, skills, and values so that the students may maintain the learning process over a lifetime and function as self-fulfilled individuals and as full participants in a society committed to change through democratic processes. (p. 2)

Likewise, in 1992, Miller professed that the goals of general education were "problem solving, decision making, and values clarification" (p. 73).

In *50 Hours: A Core Curriculum for College Students*, Cheney (1989) outlined a core curriculum with the purpose of "encouraging coherent and substantive learning in essential areas of knowledge" (p. 8). Cheney's proposal included required courses in (a) culture and civilization, (b) foreign language, (c) mathematics, (d) natural sciences and (e) the social sciences (Table 3). As with Conant (1963), Cheney's proposed core curriculum comprises approximately one-half of a college student's program of study.

Table 3

Fifty hours: A core curriculum for college students (Cheney, 1989, p. 17)

Semester hours per study area	Courses/Requirements
18 hours: Culture and Civilization	The origins of Civilization: A one-semester course that considers the beginnings of civilization on various continents. 3 hours Western Civilization: A one-semester course that considers the development of western society and thought from Periclean Athens through the Reformation. 3 hours. Western Civilization (continued): A one-semester course that considers the development of Western society and thought form the Reformation into the twentieth century. 3 hours. American Civilization: A one-semester course that traces the major developments in American society and thought from colonial times to the present. 3 hours. Other Civilizations: Two one-semester courses to be chosen from the following: Civilizations of Africa, East Asia, Islam, Latin America, South Asia. 6 hours.
12 hours: Foreign Language	A two-year requirement; it is recommended that students fulfill this requirement by taking more advanced courses in a language they have studied in high school.
6 hours: Concepts of Mathematics	A one-year course focusing on major concepts, methods, and applications of the mathematical sciences.
8 hours: Foundations of the Natural Sciences	A one-year laboratory course that focuses on major ideas and methods of the physical and biological sciences.
6 hours: the Social Sciences and the Modern World	A one-year course that explores ways in which the social sciences have been used to explain political, economic and social life as well as the experience of individuals, in the last 200 years.

Specific to agricultural education, the national standards for agricultural teacher education only state that general education in liberal arts and sciences is an expectation and that the learner should develop theoretical and practical understandings in those areas (American Association for Agricultural Education, 2001). Barrick and Garton (2010) purported that the purpose of general education in the agricultural teacher preparation curriculum is to

> help students gain knowledge and develop skills of analysis, synthesis, and evaluation essential to understanding intellectual ideas and principles; develop competence in written and oral communication; apply basic mathematics concepts and processes; gain an understanding of the natural and social sciences; and develop an appreciation of the arts, humanities, and cultural values, customs, and social interactions. (pp. 36-37)

In regard to courses, Swortzel (1995) was the only agricultural education literature found that made recommendations for specific general education courses, including 46 semester hours in the arts and humanities, mathematics and statistics, natural science, and social science, for preservice agricultural education teachers. Swortzel recommended (a) English and writing,

(b) visual and performing arts, (c) oral communication, (d) philosophy, (e) literature, (f) calculus, (g) statistics/data analysis, (h) biology, (i) chemistry, (j) physics, (k) American history, (l) political science, and (m) rural sociology. Swortzel also noted that the coursework helped to prepare preservice agricultural teachers for the following roles: (a) facilitator of learning, (b) understander of the learner, (c) program developer, (d) administrator, (e) professional educator, and (f) role model and mentor. The notion that general education coursework can help prepare preservice teachers for future roles of an agricultural teacher or provide knowledge that complements the teaching of agriculture is known as complementary knowledge (Barrick & Garton, 2010; Swortzel, 1995). To that end, one could argue that complementary knowledge is vital for facilitating learning among students with diverse backgrounds and experiences, since complementary knowledge allows the teacher to draw upon a broad education to enhance the learning environment (Cruickshank, 1985). Moreover, the specific general education requirements required by agricultural teacher education programs vary due to the requirements of institutions and state departments of education but "typically include coursework in communication arts, mathematics, biological and physical sciences, behavioral and social sciences, humanities, and fine arts" (Barrick & Garton, 2010, p. 37).

General Knowledge Competencies Derived From the Literature

Based on the literature above, the competencies presented in Table 4 are essential general knowledge competencies needed for teaching.

Table 4

Essential general knowledge competencies for beginning teachers

General knowledge competencies	Author(s)
Understanding of and the ability to be a contributing citizen/teacher in a democratic society	Barrick & Garton, 2010; Cheney, 1989; Harvard Committee on General Education as cited in Cruickshank, 1985; Miller, 1988, 1992
Knowledge of mathematics	Adler, 2009; Barrick & Garton, 2010; Cheney, 1989; Conant, 1963; Seligman & Malamud as cited in as cited in Cruickshank, 1985; Swortzel, 1995
Knowledge of science	Barrick & Garton, 2010; Conant, 1963; Seligman & Malamud as cited in as cited in Cruickshank, 1985
Knowledge of the social sciences	Barrick & Garton, 2010; Cheney, 1989; Swortzel, 1995
Knowledge of history	Adler, 2009; Conant, 1963; Seligman & Malamud as cited in as cited in Cruickshank, 1985; Swortzel, 1995
Ability to effectively communicate – oral and written	Barrick & Garton, 2010; Conant, 1963; Swortzel, 1995
Ability to solve problems and make informed decisions	Barrick & Garton, 2010; Miller, 1988, 1992
Understanding and appreciation of social values	Barrick & Garton, 2010; Miller, 1988, 1992
Knowledge of natural sciences	Adler, 2009; Cheney, 1989; Swortzel, 1995
Knowledge of literature and arts	Adler, 2009; Barrick & Garton, 2010; Seligman & Malamud as cited in as cited in Cruickshank, 1985; Swortzel, 1995
Knowledge of culture and civilizations	Barrick & Garton, 2010; Cheney, 1989; Seligman & Malamud as cited in as cited in Cruickshank, 1985
Knowledge and skills of analysis, synthesis, and evaluation	Barrick & Garton, 2010; Harvard Committee on General Education as cited in Cruickshank, 1985; Miller, 1988, 1992
Knowledge of political science	Conant, 1963; Swortzel, 1995
Knowledge of language	Adler, 2009; Cheney, 1989; Conant, 1963; Seligman & Malamud as cited in as cited in Cruickshank, 1985
Knowledge of western literature	Cheney, 1989; Conant, 1963
Understanding and appreciation of multiple philosophical paradigms	Conant, 1963; Seligman & Malamud as cited in as cited in Cruickshank, 1985; Swortzel, 1995

Conclusions, Recommendations, and Implications

The purpose of this philosophical study was to examine the professional knowledge, technical knowledge, and general knowledge competencies needed in a comprehensive teacher education program to prepare beginning school-based agricultural education teachers. Sixteen professional knowledge competencies, three technical knowledge competencies, and 16 general knowledge competencies were derived from the literature. The authors recognize the competencies identified must be placed within the context of state teacher licensure standards and requirements. With that in mind, we recommend that agricultural teacher education programs use the competencies complied in this inquiry to spur philosophical discussions regarding the coursework and experiences provided by an agricultural teacher education program. Engaging in discussion will aid teacher educators in meeting the needs of preservice teachers and other stakeholders of agricultural education. Furthermore, by engaging in philosophical discussion related to preparing school-based agricultural education teachers, teacher educators are proactively seeking to improve the teacher education program in an effort to meet societal needs. This recommendation is consistent with Swanson (1982) who stated that philosophy is at the heart of teacher education, and philosophy "requires a consideration of the destiny of individuals, groups, and society itself. It is concerned, therefore, with the concept of destination (ends) and the appropriate choice of routes (means) which may be available, or which may be made available" (p. 298). Additionally, the recommendation is supported by Roberts and Kitchel (2010) who purported that quality teacher education programs are guided by a coherent scope and sequence with sound theoretical underpinnings.

Future research should seek to discover the most effective and efficient ways of preparing beginning school-based agricultural education teachers in regard to the professional knowledge, technical knowledge, and general knowledge competencies discussed in this study. This research is vital due to budgetary concerns and based on the fact that many universities are decreasing or limiting the number of hours in the baccalaureate degree. Moreover, the coursework configuration and the professional knowledge, technical knowledge, and general knowledge competencies emphasized should be guided by a philosophy of agricultural teacher education, since the philosophy behind the kind of teacher education one receives affects the preparedness of beginning teachers (Darling-Hammond, 2006).

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