Journal of Agricultural Education, 58(2), 98-110.
https://doi.org/10.5032/jae.2017.02098

A Philosophical Review of Science and Society within Agricultural Education

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Abstract

We utilized philosophical and historical perspectives to analyze the interconnectedness between agricultural education, science, and society. Using historical evidence, the adaptive role of agricultural education was discussed and recommendations for future adaptability were described. Additionally, connections between agricultural education, science, and society were evaluated in light of the call for agricultural educators to illuminate the links between science and society. In our exploration, the feasibility of linking science and society within school-based agricultural education was considered as well as the motivation and competence of current agriculture teachers to link science and society. Three types of secondary agriculture teachers emerged: (a) science illuminators, (b) illumination attempters, and (c) vocational purists. Recommendations are made for research exploring how identified classifications of teachers meet the science and social learning needs of students. Additionally, recommendations include methods for operationalizing agriculture, science, and society connections to enhance student learning and the positive impact of school-based agricultural education.

Keywords: Science; society; science illuminators; illumination attempters; vocational purists

Introduction

Perhaps more than any other discipline, agriculture and food production have been shaped by the demands of society. Consequently, the shifting demands of society have pushed the role of school-based agricultural education (SBAE) to fluctuate between vocational preparation and science knowledge building. By conducting a philosophical review, we sought to examine how the needs of society have impacted the role of SBAE throughout the history of the discipline. A historical review of the relationship between SBAE and society provided a foundation for a philosophical discussion regarding the ability of current teachers to connect science and society within SBAE curriculum, a call made by the National Research Council (1988) in the publication, *Understanding Agriculture: New Directions for Education*. The proceeding discussion addresses the national research agenda priority of evaluating delivery methods to ensure continually efficient and effective SBAE programs (Roberts, Harder, & Brashears, 2016).

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Objectives, Methods, and Conceptual Framework

The objectives of the current study were to (a) explore the historical development of SBAE, (b) consider the responsiveness of the discipline to societal influences, and (c) lay a philosophical basis for considering the ability of current teachers to connect science and society within SBAE curriculum. In order to accomplish the objectives, we utilized both philosophical and historical perspectives. Combining philosophical and historical perspectives allowed us to analyze past developments to inform current understandings and future directions.

Philosophical research is necessary when the goal is to clarify meanings, identify ethics, make values manifest, and study the nature of knowledge (Ellis, 1983). We adopted a philosophical lens to add clarity to meanings and illuminate the values and nature of knowledge within SBAE. However, we cannot separate the philosophical considerations from the historical perspectives necessary to situate our thoughts and provide a meaningful context. The historical perspective allowed us to analyze past trends and events to uncover connections useful to our current situation and future endeavors (Leedy & Ormrod, 2012). Throughout our analysis, we utilized a variety of data sources (e.g., historical texts, research articles, governmental reports) spanning from 1929 to 2015 to establish the foundation needed to meaningfully consider future directions.

Our conceptual framework suggests SBAE fits within, and aligns with, the needs, values, and legislative actions occurring within society; therefore, we sought to link how changes within society have spurred changes within SBAE (see Figure 1). Furthermore, the connection between SBAE and society is seen as a reciprocal relationship helping to ensure the continued viability and importance of SBAE. As the paper unfolds, we spend the first portion laying out the evolution of SBAE as impacted by shifts in society, followed by a philosophical examination of vocational agriculture, agricultural science, and societal influences culminating in a discussion of how teachers are connecting science and society within SBAE curriculum.

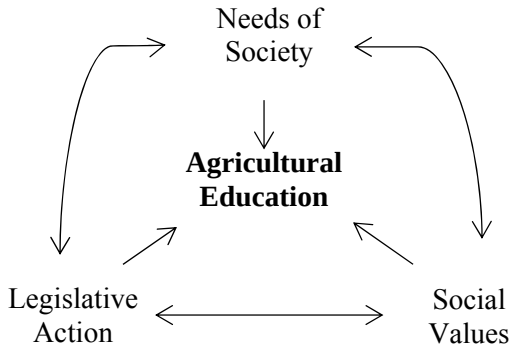

Figure 1. Conceptual framework of the relationship between SBAE and society.

Laying the Foundation: Agricultural Education and Society

The following historical review of SBAE describes three time periods in the discipline: (a) the early years of SBAE, (b) the Smith-Hughes years of vocational agriculture, and (c) the current focus on agricultural science. While many studies have chronicled the history of SBAE, the

following analysis uniquely details shifts between vocational agriculture and agricultural science as influenced by society's demands.

Historically, the role of SBAE has fluctuated between vocational preparation and science knowledge building. Operationalizing each approach is a necessary prerequisite to our historical review. Vocational preparation has been defined as the "systematic instruction in agriculture…for the purpose of preparing people for initial entry or reentry into agricultural occupations" (Phipps, Osborne, Dyer, & Ball, 2008, p. 23). Phipps et al. also offer the following definition for SBAE as science knowledge building, "examining agricultural practices and understanding the science that explains why these practices have certain effects on plants, animals, and natural resources" (2008, p. 337). The distinguishing characteristic between vocational and science-based approaches to SBAE is the desired student outcomes. In the science knowledge building approach, the goal is students with an improved understanding of science and its role within agriculture. The aim of vocational preparation is to develop students with the knowledge and skills necessary to obtain employment in the field of agriculture. In an effort to remain concise, we refer to vocational focused SBAE as *vocational agriculture* and science knowledge focused SBAE as *agricultural science*.

Early Years of Agricultural Education

The genesis of SBAE in the United States can be traced to 1734 (Moore, 1987), a time when the majority of the population was engaged, at some level, in production agriculture (True, 1929). Surprisingly, the agriculturally-based society of the mid 1700s did not rely on SBAE to prepare the majority of farmers; instead, agricultural training was accomplished through informal apprenticeships between fathers and sons. However, SBAE was initially established to serve orphans, with the first formal agriculture school being the Salzburgers' Orphan's School in Georgia (Wheeler, 1948). SBAE continued to train less fortunate populations, via orphans' schools and missions compounds, throughout the early part of the 1800s (Moore, 1987).

While orphans' schools and missions compounds played a critical role in the origins of SBAE, the first period of growth beyond orphans' schools and missions compounds occurred through private schools. During a time when father-son agricultural apprenticeships were common, some affluent families opted to send son(s) to private schools to learn improved farming practices (True, 1929). Between the early 1800s and 1862, enrollment in private schools like Gardiner Lyceum in Maine, flourished. The role of private schools can be seen in the established purpose of Gardiner Lyceum, "a school for teaching mathematics, mechanics, navigation, and those branches of natural philosophy and chemistry which are calculated to make scientific farmers and skillful mechanics" (True, 1929, p. 36). The decline of SBAE in private schools began in 1862, with the passage of the Morrill Act (Moore, 1987). Although the Morrill Act is highly regarded for creating post-secondary institutions of agriculture, the 1862 Act greatly decreased enrollment in secondary SBAE as parents viewed postsecondary agriculture as a superior alternative to secondary school agriculture (Moore, 1987).

From initial development to the Morrill Act, SBAE was designed to prepare farmers. The vocational agriculture approach was necessary to meet the social need for a large number of competent farmers. However, with the onset of the industrial revolution, the needs of society changed dramatically. The number of farmers decreased and the need for more efficient farming methods increased (Hillison, 1996). With high social demand for improved farming techniques, the Hatch Act was passed in 1887. The Hatch Act represents a critical shift in the focus of SBAE from vocational agriculture to agricultural science.

The Hatch Act, which established experiment stations designed to provide farmers with information useful for increasing yields, ushered in a new era of scientific agriculture (Hillison, 1996). The subsequent agricultural-science revolution gave SBAE teachers a mission to share science-based agriculture knowledge (Moore, 1987). With the promise of learning cutting edge science through agriculture, student enrollment in SBAE grew substantially between 1887 and 1917 (Moore, 1987). What was initiated by a social demand for increased agricultural efficiency turned SBAE into the epitome of agricultural science; agriculture teachers in the late 1800s and early 1900s were building student understanding of science and agriculture. However, on February 23, 1917 the reign of agricultural science which dominated for 30 years gave way to a new era of vocational agriculture.

Smith-Hughes Years of Vocational Agriculture

In the mid-1800s, the American population experienced the promise of the industrial boom followed by the hardships of an economic depression in the late 1800s. In the search for an explanation to the economic downturn, evidence emerged suggesting a breakdown in vocational preparation (Smith, 1999). The role of education in vocational preparation became a topic of debate, and many argued schools at the time were overemphasizing academics at the expense of workforce preparation (Smith, 1999; Urban & Wagoner Jr., 2009). Amidst an increasing social demand for trained employees, paired with criticisms targeting the academic nature of schools, the Smith-Hughes Vocational Education Act of 1917 was passed. Almost overnight, the agricultural science approach was replaced by an emphasis on vocational agriculture (Malpiedi, 1987).

With the passage of the Smith-Hughes Act, vocational education became "defined as systematic programs of instruction with the controlling purpose of fitting individuals for useful employment" (Malpiedi, 1987, p. 11). The Smith-Hughes Act was designed to fulfill society's need for a prepared workforce and SBAE was tasked with preparing the future farmers of America. However, science was not completely removed from the curriculum. In fact, early vocational agriculture teachers sought to be "comprehensive in coverage, scientific in nature, and practical in impact and focus" (National Research Council, 1988, p. 57). Enrollment numbers suggested the vocational agriculture approach was working, as the number of students in SBAE tripled from 1918 to 1921 (Malpiedi, 1987).

As SBAE continued to evolve, so did the American education system and social values. Postsecondary education was becoming more widely pursued and secondary schools began tracking students into either academic or vocational routes (Urban & Wagoner Jr., 2009). With a shift toward educational tracking, the scientific emphasis of vocational agriculture was removed. SBAE remained focused on preparing farmers until the discipline underwent revision with the passing of the Vocational Act of 1963 (Balschweid, 1998). The disciplinary revision spurred by the Vocational Act of 1963 was again influenced by changes in society. Increased public awareness of agricultural vocations beyond farming spurred legislators to remove stipulations mandating vocational agriculture only prepare farmers, opening the door for new areas of study within vocational agriculture, including agricultural mechanics, horticulture, and natural resources (Phipps et al., 2008). Additional legislation ended sex discrimination in vocational education (i.e., Educational Amendments of 1976) and improved vocational education quality, including increased access to students with special needs (i.e., Carl Perkins Act of 1984). Identified legislative actions aligned SBAE with social values, however, legislations also reinforced the vocational nature of SBAE (National Research Council, 1988). However, two landmark reports altered the discourse in education and forced vocational agriculture to reexamine its role in a changing society.

Current Focus on Agricultural Science

One of the most impactful reports on American education was *A Nation at Risk* (*ANAR*; Ravitch, 2010). *ANAR* brought to light the downward trend of standardized test scores, in areas such as math and science, and relative failure of American students when compared to international peers (National Commission on Excellence in Education, 1983). *ANAR* forced the American public to critically evaluate its education system. Additionally, *ANAR* offered recommendations for solving the educational issues, including a call for increased secondary school graduation requirements in English, math, science, and social studies (National Commission on Excellence in Education, 1983). Leaders in vocational education, like SBAE, realized higher graduation requirements in core academic subjects meant fewer students in vocational courses. SBAE faced another opportunity to adapt to meet the needs of a changing society.

The publication of *ANAR*, public scrutiny of vocational education, and declining enrollment in SBAE spurred publication of *Understanding Agriculture: New Directions for Education* in 1988 (Phipps et al., 2008). *Understanding Agriculture: New Directions for Education* brought together SBAE leaders from across the discipline who recommended a shift from vocational agriculture to agricultural science. Included in the recommendations were calls to update curriculum, rename the Future Farmers of America (i.e., the affiliated student organization), and offer science credit for SBAE coursework (National Research Council, 1988). The publication of *Understanding Agriculture: New Directions for Education* represented an attempt to overhaul SBAE to meet the increasing emphasis on core academic subjects like science. Additional legislation (i.e., Carl D. Perkins Vocational Education Amendments of 1990 and 2006) cemented agricultural science as the focus of SBAE (Thompson, Marshall, Myers, Warnick, & Wilson, 2013). Furthermore, recent social pressure to educate students in science, technology, engineering, and mathematics (i.e., STEM) has provided additional emphasis on SBAE as a science-focused discipline (Wilson & Curry Jr., 2011).

While the overwhelming trend in SBAE since 1988 has been agricultural science, some advocate for a return to vocational agriculture. One of the earliest concerns voiced among vocational agriculture advocates was "[agricultural science] faces the potential danger of becoming absorbed within the science curriculum as a class rather than a separate, distinct program" (Vaughn, 1993, p. 4). With more than 25 years of agricultural science programs remaining distinctive at the secondary school level, the concern of SBAE being absorbed into science programs has lost its merit. However, research suggests while the majority of SBAE teachers support the integration of science concepts, approximately 10% to 20% support a more vocational approach (Balschweid & Thompson, 2002; Myers & Washburn, 2008; Thompson & Warnick, 2007; Thoron & Myers, 2010). Findings illustrate a current divergence in the field of SBAE; a majority of teachers who support agricultural science and a minority of teachers who support vocational agriculture. As we consider current policies and practices within SBAE, and the ability of teachers to "illuminate the links" between science and society (National Research Council, 1988, p. 62), we must consider the ability of both agricultural science and vocational agriculture curriculum to connect science, society, and agriculture.

Agricultural Science and Vocational Agriculture: Linking Science and society

The preceding historical analysis revealed SBAE has remained relevant by adapting to changes in social needs, social values, and guiding legislation. The process of continual evolution has potentially contributed to both agricultural science and vocational agriculture approaches currently being employed within SBAE. With a history of remaining relevant by adapting to the

needs of society, SBAE must now consider its alignment with the established call to "illuminate the links" between science and society (National Research Council, 1988, p. 62).

The National Research Council (1988) emphasized the term illumination, which we utilized as a separate and distinct concept from integration, a commonly used term in education. Integration implies separate silos of study (i.e., agricultural education, science, and society) in which the SBAE teacher is asked to seize content from one area (i.e., science or society) and purposefully place the selected content into SBAE curriculum. Additionally, integration implies teaching an additional content area, which can be philosophically challenging for both developing and seasoned SBAE teachers.

Illumination, on the other hand, implies bringing to light what is already present. Conceptually, illumination recognizes science concepts, ideas, and practices as foundational to agriculture and inherent within SBAE curriculum. The role of the teacher in curriculum illumination is to identify the science present within SBAE and make students aware of implicit science concepts.

In an effort to analyze the potential for current practices within SBAE to illuminate science and society within SBAE curriculum, we considered evidence within three literature-based criteria. First, using the history of SBAE as a reference, we considered if connections between science and society are possible within SBAE. Second, using the expectancy-value theory as a framework, we considered if SBAE teachers perceive the value and competence necessary to illuminate the links between science and society. Finally, in accordance with recent literature throughout education, we looked beyond perceived competence to consider if SBAE teachers possess the knowledge of science and society needed to illuminate the links between science, society, and agriculture.

Feasibility of Illumination

Before considering if current practices within SBAE attend to the links between science and society, we must consider if such an approach is feasible. Throughout SBAE history, we identified two periods in which SBAE linked science, society, and agriculture, the agricultural science approach following the Hatch Act and the vocational agriculture approach immediately following the Smith-Hughes Act.

In the era following the Hatch Act, SBAE teachers "viewed instruction in science and nature as a way to make public education relevant to rural life" (National Research Council, 1988, p. 55). SBAE following the Hatch Act was a dynamic system of sharing science knowledge, created through experiment stations, to meet the social need for increased agricultural efficiency (Hillison, 1996; True, 1929). Furthermore, a landmark approach to SBAE, Stimson's project method, was developed around the same time period (Moore, 1988). The project method was a way of teaching science-based agriculture content within SBAE which could be immediately applied to problems outside school (Moore, 1988).

In addition to the agricultural science approach employed after the Hatch Act, the model of vocational agriculture immediately following the Smith-Hughes Act was successful in connecting science and society. SBAE following the Smith-Hughes Act was designed to engage students in using science to solve practical problems related to a career in farming (National Research Council, 1988). SBAE immediately following the Smith-Hughes Act met the social need for scientifically knowledgeable professionals in production agriculture and served as an example vocational agriculture approach which linked science, society, and agricultural content.

Using historical models as evidence, we conclude SBAE is able to dynamically connect science and society. Additionally, connections can be accomplished through either the agricultural science or vocational agriculture approach. With understanding science and society connections within SBAE are possible, we shift attention to the current model of SBAE to analyze the role teachers play in illuminating the links between science and society within SBAE.

Prerequisite to Illumination: Motivation

Rarely are goals achieved without individuals motivated to achieve the desired outcomes. Therefore, we must consider if current teachers are motivated to connect science and society within SBAE curriculum. One of the leading theories in the field of motivation is the expectancy-value theory (EVT; Wigfield & Eccles, 2002). EVT posits two requirements for motivation, expectancy for success and perceived value (Wigfield & Eccles, 2002). In other words, an individual is motivated to attempt a behavior when he or she feels competent in the given behavior and when he or she feels the behavior has value. Unfortunately, SBAE literature falls silent on the competence and value teachers perceive toward illuminating the links between science and society. However, a substantial literature base has addressed the perceived competence and value of SBAE teachers toward science. While we acknowledge existing literature limits our understanding of the motivations to link science *and* society, we feel past research provides a valuable basis for considering the motivations of agriculture teachers to begin to illuminate connections between science, society, and agriculture content.

As we alluded to earlier, the majority of SBAE teachers perceive value in teaching science concepts (Balschweid & Thompson, 2002; Myers & Washburn, 2008; Thompson & Warnick, 2007; Thoron & Myers, 2010). Additionally, the majority of SBAE teachers perceive high levels of competence teaching science (Balschweid & Thompson, 2002; Hamilton & Swortzel, 2007; Newman & Johnson, 1994; Scales, Terry, & Torres, 2009). Taken in combination, existing research suggests the majority of SBAE teachers possess the two required elements for motivation (i.e., value and perceived competence); however, research has also identified a minority of teachers who do not value and/or do not feel competent teaching science within SBAE curriculum. While the literature fails to describe the identified subset of teachers beyond a lack of competence and/or perceived value, we assert teachers who do not value science illumination and/or do not feel competent teaching science, lack the motivation necessary to connect science and society within SBAE curriculum.

Research suggests the majority of teachers have the prerequisites of motivation, at least in regards to illuminating science, necessary to attempt connecting science and society within SBAE. However, motivation is only a component of the attributes necessary to link science and society within SBAE. In the next section, we explore evidence regarding SBAE teachers' measureable competence connecting science and society.

Prerequisite to Illumination: Competence

General education research (Darling-Hammond & Bransford, 2005) as well as research in SBAE (Scales et al., 2009; Stripling & Roberts, 2012) highlight the importance of content knowledge when considering curriculum illumination efforts. If SBAE is to illuminate the connections between science and society for students, teachers must be competent in science and society. Again, the literature fails to address the area of society when considering the measureable competence of SBAE teachers. However, competence in science is required to connect science and society and the literature addresses science competence; therefore, our analysis will consider the

science competence of teachers as a required element to link science and society within SBAE curriculum.

As we reviewed the literature for evidence of SBAE teacher competence in science, two opposing strands of research emerged. The first strand analyzed the perceptions of stakeholders regarding the science competence of SBAE teachers. The second strand is characterized by empirical assessments of science competence among SBAE teachers. In the following discussion, we analyze the affordances and constraints of each body of literature in addressing our question of science competence among SBAE teachers.

Research has assessed the perceptions of a variety of SBAE stakeholders regarding the science competence of teachers. Existing research has identified secondary school administrators (Johnson & Newman, 1993), guidance counselors (Johnson & Newman, 1993), science teachers (Warnick & Thompson, 2007; Warnick, Thompson, & Gummer, 2004), and state supervisors (Thompson et al., 2013) agree SBAE teachers possess the competence required to illuminate science. While perceptions-based research offers promising evidence regarding the science competence of SBAE teachers, the methodology must be challenged. While the view of external stakeholders is important when considering support for agricultural science programs, perceptions provide minimal information regarding the actual capability of SBAE teachers to connect science and society. Therefore, our attention turned to a line of research with the teacher as the unit of analysis.

The second strand of research, characterized by standardized assessments of science knowledge, has identified troubling results regarding the science competence of SBAE teachers. Of the four studies identified, only one revealed encouraging findings regarding measurable science knowledge (Myers, Washburn, & Dyer, 2004). However, the encouraging finding were observed among a purposive sample of SBAE teachers who opted into a science-focused workshop, a potential sampling bias which may have influenced the results. The three remaining studies offer substantial evidence, when the population of study is not purposively selected, an alarming proportion of SBAE teachers (i.e., average of 65%) perform below established levels of proficiency on assessments of science knowledge (Hamilton & Swortzel, 2007; Scales et al., 2009; Wilson, Kirby, & Flowers, 2001). Findings highlight science competence as a limiting factor for the majority of SBAE teachers to connect science and society, a finding supported throughout SBAE literature. More specifically, SBAE literature suggests if teachers are asked to connect science and society within SBAE curriculum, knowledge of science among teachers must improve (Conroy & Walker, 2000; Scales et al., 2009; Shelley-Tolbert, Conroy, & Dailey, 2000).

Agricultural Education: Unified Illumination or Separate Disciplines

The history of SBAE illustrates a discipline able to adapt to either vocational agriculture or agricultural science based on social needs, social values, or legislative action. The flexibility of SBAE has enabled the discipline to remain a viable component of education throughout its history; however, disciplinary flexibility has also resulted in evidence of two groups among SBAE teachers, agricultural science educators and vocational agriculture educators. Using the history of SBAE as evidence, we found either approach has served as an effective model of "[illuminating] the links" between science and society (National Research Council, 1988, p. 62). Additionally, evidence suggested the majority of SBAE teachers possess the elements of motivation required to attempt science illumination (i.e., value and perceived competence); however, a lack of measureable science competence was identified as a barrier to current teachers connecting science and society within SBAE curriculum. With convincing evidence suggesting teachers lack requisite science knowledge, SBAE as a whole is not meeting the vision to connect science and society.

The question then becomes, what goal(s) are SBAE teachers accomplishing? From our findings, we posit three types of SBAE teachers (i.e., science illuminators, illumination attempters, and vocational purists; see Figure 2) potentially meeting or attempting to meet different goals.

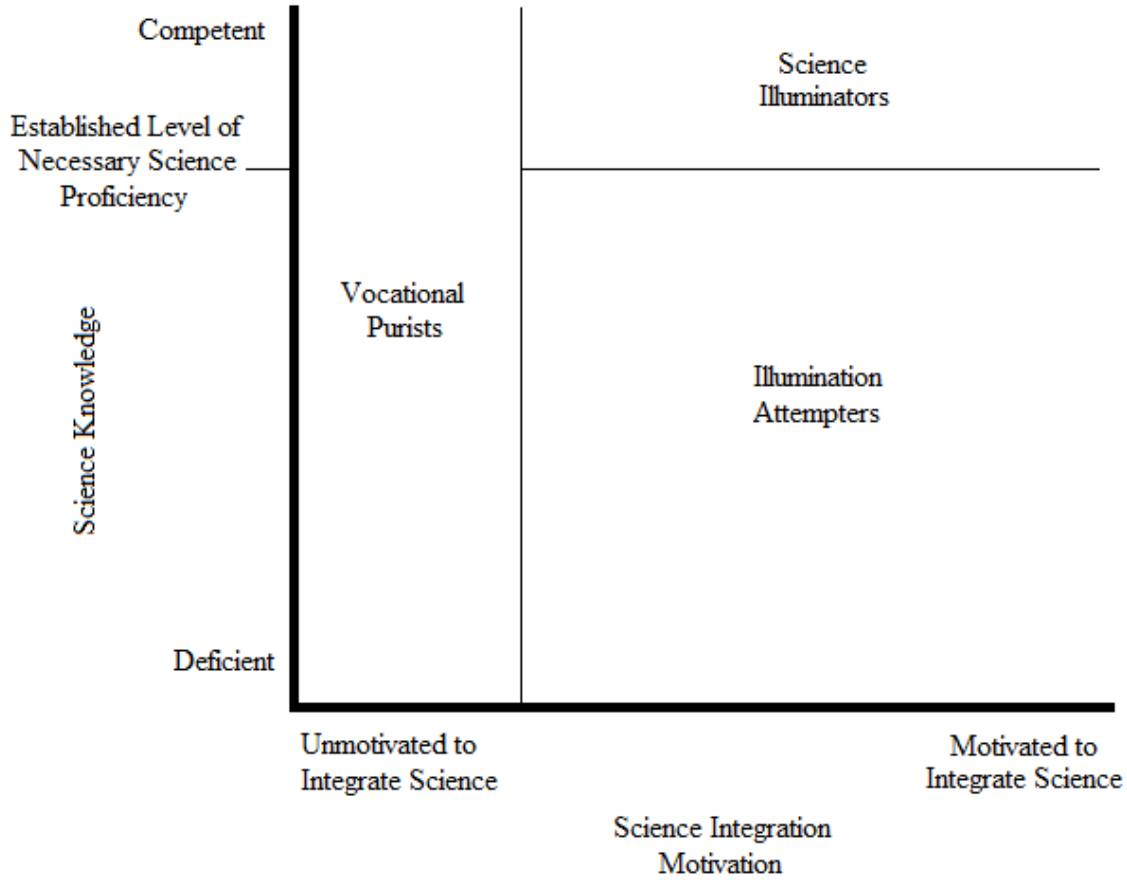

Figure 2. Graphical representation of three types of SBAE teachers. Figure two is not designed to show an exact proportion of the three identified groups, rather the figure is intended to capture a conceptual overview of the three types of teachers.

Science illuminators, the first classification of teachers, are SBAE teachers motivated to illuminate science who also possess requisite levels of science knowledge, characterized as teachers who performed well on the empirical assessments of science knowledge. Science illuminators have the knowledge and motivation to connect science and society within SBAE classrooms. However, we cannot assume science knowledge and motivation equate to teachers linking science and society within curriculum. Research should identify science illuminators to see if, and how, identified illuminators are accomplishing the call to link science, society, and agriculture within SBAE curriculum (National Research Council, 1988).

The second group of SBAE teachers, *illumination attempters*, are motivated to illuminate science; however, lack the science knowledge necessary to connect science and society within SBAE curriculum. While illumination attempters may be attempting to connect science, society, and agriculture, limited science knowledge hinders success. As a profession, SBAE must consider

how to supplement the motivation of illumination attempters with requisite science knowledge to support student learning of the interconnectedness of science, society, and agriculture.

The final group of SBAE teachers identified is the *vocational purists*. Classifying teachers as vocational purists is based on our supposition, supported by the expectancy-value motivational theory, indicating teachers who do not value teaching science concepts within agriculture and/or who do not feel competent illuminating science are not attempting to connect science, society, and agriculture within SBAE curriculum. In the absence of science illumination, one can assume vocational purists are opting for a more vocational agriculture approach. The vocational approach, void of science illumination, fails to meet the call to illuminate the links between science and society within SBAE.

Conclusions

As we consider the future of SBAE, one thing is almost certain, the discipline will change. As the discipline continues to evolve to meet the ever-changing values and needs of society, continued efforts must be made to ensure high quality educational experiences for SBAE students. Using philosophical methods, we considered the ability of current SBAE policies and procedures to meet the call to "illuminate the links" between science and society (National Research Council, 1988, p. 62). As SBAE seeks to improve, efforts must be made to identify innovative approaches to connect science, society, and agriculture.

Foundational to the history and future of SBAE is the ability to illuminate connections between science, society, and agriculture. The concept of illumination provides an alternative to the concept of integration in regards to facilitating student connections between science, society, and agriculture. Whether vocational purists, illumination attempters, or science illuminators, if we embrace a shared understanding of science as foundational to, and already integrated within, all aspects of SBAE, our focus switches from learning additional content (e.g., science) to simply developing the teaching skills to allow the scientific concepts to surface within valuable agriculture concepts and ideas. Within teacher education, we must consider how we can empower preservice teachers with an understanding of science, society, and agriculture as a cohesive, unified discipline rather than distinct disciplines in need of integration. Empowering preservice teachers with a new perspective of science, society, and agriculture may require supplementing, or replacing, preservice science education requirements, which teach science outside the context of agriculture, with courses which exemplify the interconnectedness between science, society, and agriculture.

In addition to highlighting the importance of using "illumination" to describe student learning of the connections between science, society, and agriculture, our analysis revealed evidence of a conceptual divide between three types of SBAE teachers: (a) vocational purists, (b) illumination attempters, and (c) science illuminators. Reflection on our history as a discipline revealed the potential impetus for the formation of the three classifications of teachers. However, no research exists quantifying the distinctions between groups. We recommend research explore the theoretical divisions between the three teacher classifications and how members of each group view the purpose of SBAE. Understanding the development, cultivation, and continuation of the three groups will enable agriculture teacher educators to develop coursework and workshops aimed at both addressing student and societal needs and developing the most effective SBAE teachers possible. Given the wide variety of SBAE programs, research should remain cognizant of potential differences based on program location and teacher demographics.

Examining the past may, at times, illuminate the road ahead. SBAE has undergone three major historical shifts from its inception through the Smith-Hughes years and now into a focus on

agricultural science. The evolution of SBAE, shaped by cultural and societal influences, has enabled the discipline to remain both relevant and responsive to society. Based on our historical and philosophical analysis, we recommend SBAE explore the establishment of a unified or even a semi-shared focus, allowing for the purposeful and strategic growth of the discipline. Research highlights adaptability as a historical strength of SBAE; yet, as we look to the future, the philosophical distinctives of vocational purists, illumination attempters, and science illuminators may hamper the ability of SBAE to respond and adapt quickly to social changes. Identification of shared intent, coupled with a philosophical understanding of illumination, will enable us to strategically develop the coursework, tools, and resources to prepare SBAE teachers for unified success.

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