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AGRICULTURAL LITERACY: CLARIFYING A VISION FOR PRACTICAL APPLICATION

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Abstract

"Agricultural literacy" is a working concept with considerable range in meaning and impact. An overview of agricultural literacy curricula shows complementary deductive and inductive approaches to the systematic incorporation of agricultural education in K-12 classrooms. Based on positions discussed at the 2005 Agricultural Literacy Special Interest Group meeting of the American Association for Agricultural Education, the authors identified three curricular approaches to promote agricultural literacy: (1) a deductive approach based on programmed frameworks, (2) an inductive approach based on the application of knowledge and process skills, and (3) a utilitarian, values-based approach promoting evaluation of agri-food system issues. The authors provide an original conceptual model underscoring points of possible synergy between these approaches. The model points out interactions imposed on the system by cognitive-constructivist expectations for learning, which conflict with political and social pressures for a "traditional" curriculum assessed through "high-stakes" tests. The authors suggest capitalizing on the strengths of each approach to lever change within the current public education environment. The authors offer a systematic plan that may resolve the external conflict between the expectations of agricultural educators and political/social advocates of standardized curricula and high stakes testing, turning these pressures into forces to promote agricultural literacy.

Introduction

Issues related to agricultural literacy have become more compelling in recent years, for both the general public and the agricultural education profession. The historical focus among agricultural professionals has emphasized the development of a consensus definition of agricultural literacy. However, as agricultural literacy efforts have shifted toward integration into academic curricular content in the current climate of public education policy, perceived differences in philosophical approaches have resulted in new points of perceived conflict or opportunity.

During the past few years, the agri-food system has come under strong criticism. As a result, perceptions of the general public have been challenged dramatically by books, such as *Fast Food Nation* (Schlosser, 2002) and *The Omnivore's Dilemma* (Pollan, 2006), calling attention to the lack of public understanding of "the moral and ecological repercussions" (Kuh, 2006, para. 3) of the decisions we make when producing food. Project 2061 of the American Association for the Advancement of Science (AAAS) also has raised many long-term agricultural literacy issues related to management of and policies in food production, resource use, and sustainability (AAAS, 2006).

Since agricultural literacy first became a concern, the agricultural education profession has responded by defining what is meant by agricultural literacy, identifying modes of delivery, and developing a knowledge base linked to standards with a valid, reliable means of assessment. Within the agricultural education profession, Frick, Kahler, and Miller (1991) outlined the

widely accepted definition of agricultural literacy. Efforts to fully articulate this definition and to assess the outcomes of agricultural literacy efforts, however, have produced much discussion with very limited consensus due to perceived philosophical, political, and epistemological differences. In May 2005, and again in 2006, discussions of the Agricultural Literacy Special Interest Group meeting of the American Association for Agricultural Education focused on three distinct approaches based on the philosophical and epistemological positions of the participants.

Approach # 1: Programmed Agricultural Literacy (Deductive Model)

Premise: Agricultural literacy should be viewed as a driving force in the K-12 curriculum, monitored and fostered through a formal agricultural literacy framework with its own multi-disciplinary curriculum, values, and agenda. The primary goal of this approach is to meet the standards of an agricultural literacy framework through infusion with academic content, thematically weaving agricultural materials through academic courses, to establish agricultural literacy as a content area within the curriculum without a designated "agriculture" class.

Approach #2: Emergent Agricultural Literacy (Inductive Model)

Premise: Agricultural literacy results from integrating interdisciplinary academic and process skills in context while focusing on an agricultural issue. Emergent agricultural literacy is an outgrowth of the simultaneous development of generalized academic skills and the specific contextual learning inherent in the agricultural problem to be solved. The integration of academic skills and their application to an agricultural problem relies in actual practice on the ability to "justify" curriculum decisions in lesson plans through correlation to academic frameworks. Agricultural contexts serve as vehicles to promote academic performance and agricultural literacy "emerges" as an end-product.

Approach #3: Agriculturally Literate Value Judgments (Evaluative Model)

Premise: Agricultural literacy revolves around the ability to think critically and make value judgments about the impact of agriculture as an economic and environmental activity and the concurrent societal and political pressures that result from those judgments. An agriculturally literate person should be able to analyze and evaluate "trade-offs" to individuals and to society resulting from agricultural enterprises. The nature of the decisions and value judgments drive the agricultural content. Understanding of agriculture is demonstrated by the ability to enter into discourse about and make decisions in response to choices facing society.

Purpose Statement

The purpose of this paper is to foster a dialogue to promote a common vision for literacy by identifying and defining approaches to agricultural literacy curriculum development, implementation, and assessment. The authors offer a dynamic graphical model that underscores the interconnections between these approaches and points to areas of synergy. The authors then use this model to identify leverage points for change and articulate steps to further promote a shared vision to achieve agricultural literacy.

Definition of terms

A definition of terms facilitates understanding of the model presented in this paper and clarifies the contrasting implications for promoting change that can be attributed to philosophical and epistemological differences between "cognitive constructivist" and "traditional" perspectives. Posner (1995) defined these positions relative to schools:

> Cognitive constructivist – Schools emphasize rote learning too much and do not put enough emphasis on real understanding and thinking. Curricula need to allow students to construct their own knowledge based on what they already know and to use that knowledge in purposeful activities requiring decision making, problem solving, and judgments.

> Traditional – Schools need to return to the basics, that is, to a mastery of basic literacy and computational skills, to a knowledge of basic facts and terminology that all educated people should know… (p. 65).

A Shared Vision for Change

In the past, a close identification with a common agrarian culture and heritage resulted in a shared sense of agricultural literacy, arising from intimate familiarity with the production, distribution, and use of agricultural products. As the United States has become more urbanized, this connection has become more tenuous. Lack of knowledge about agricultural issues could be misperceived as apathy, attenuating the perception of need for agricultural literacy. As a 2000 report by Roper Starch World Wide (as cited by Arkansas Foundation for Agriculture, 2006, para. 2) stated, "Agriculture must do a better job of taking its message to American consumers… [who] haven't heard, or don't know about many farm technologies [and] …would actually welcome agriculture's side of the story."

The diffusion of interests and agendas under the broad umbrella of agriculture compounds the challenge posed by lack of awareness, making it difficult to gain support for a common vision of agricultural literacy. Yet, a common vision is necessary for systematic change. Communicating a shared vision creates a "field of shared meaning" and mutual understanding that is "profoundly different from [merely] writing a vision statement" (O'Neil, 1995, p. 22). Without shared vision, progress is severely impeded. A firm theoretical framework is fundamental to establishing systematic working goals to implement a vision, provides a roadmap to chart progress and evaluate outcomes, and is essential to prevent duplication of efforts.

Barriers to the Development of a Shared Vision for Agricultural Literacy

According to Morrison (as cited in Lauer, 1976), social movements—such as the agricultural literacy movement—depend on a large number of people experiencing an identified discontent, communicating a clear difference in conditions defining the discontent, and voluntarily associating to advance the ideals of the group in opposition to the identified discontent. A growing perception of agricultural illiteracy led to the identification of a common discontent that generated pressure to combat this illiteracy in various segments of society such as the agricultural industry, portions of the education establishment (e.g., agriculture, science, nutrition), environmental and sustainability activist groups, and government agencies with an agricultural focus. Such pressure, however, often has been disconnected and largely unheeded.

The push for agricultural literacy also has suffered somewhat from a perceived lack of utility outside of the agriculture field, which makes problematic the identification of a common sense of discontent. In contrast, reading and mathematics literacy have been considered essential to almost any job, as well as for basic functioning in society (Lowell, n.d.). Many functions in daily society, however, seem to have little direct dependency on a generalized agricultural literacy. Businesses have not depended on agricultural literacy to make sales and few if any jobs outside of the agricultural sector have depended on a generalized application of agricultural knowledge. There appears to be, however, growing concern from consumer and environmental groups not commonly associated with agricultural interests for a functional level of agricultural literacy to understand food safety concerns and environmental trade-offs associated with the structure of the agri-food system.

Timing and opportunity also have become important issues in promoting agricultural literacy. In most states, public school agricultural content at the lower grades has been largely non-existent, except as infused into core subjects at the discretion of the individual teacher. At the secondary and post-secondary level, agricultural content is often focused on technical knowledge and skills in a career-oriented context. Agricultural knowledge acquired by the vast majority of public school students not enrolled in an agriculture course, is somewhat limited (Bowers & Kohl, 1986; Horn & Vining, 1986; Williams

& White, 1991). The low agricultural knowledge scores of students not enrolled in agriculture courses leads one to suspect that what agricultural knowledge they do have has not been integrated into a larger perspective that could be termed "literacy." Ironically, the key to integrating this body of disparate facts may well be in place already, in the form of the current "high stakes testing" environment driving school curriculum decisions toward a traditional curriculum focused on basic skills. To provide a clearer focus on basic skills, "high stakes testing" may unwittingly encourage teaching academic concepts in specifically agricultural and environmental context.

Within education, there has sometimes been a dichotomy of purpose regarding agricultural literacy. Some academic core content teachers have been willing to teach a curriculum that promotes agricultural literacy if correlated with state standards (Blackburn, 1999). In contrast, agriculture teachers have been more likely to view agricultural literacy as an outgrowth of career-centered context goals (Agnew & McJunkin, 2005). Academic teachers have not always treated agricultural literacy with the same degree of depth or quality as agriculture teachers. The long-term consequences of this disparity in vision may have tended to increase the perception of agricultural literacy as a specialized interest and ultimately increase the lack of awareness within the general population.

Historical Perspectives on Agricultural Literacy

According to Kruger and Mundt (1991) agricultural education must continue to evolve to meet the needs of students in the 21st century. Throughout the past twenty years, efforts to define agricultural literacy have moved from the mostly technical aspects of production and distribution of agricultural goods to include a sense of broader environmental and global social significance. More recently, there have been efforts to define agricultural literacy in terms of conversational knowledge, critical analysis, and value-based judgment.

The National Research Council (NRC, 1988) devoted considerable attention to identifying and describing the essential elements and ideals of "agricultural literacy." The initial definition linked agricultural literacy to the historical, economic, social, and environmental significance of the food and fiber system, encompassing "practical knowledge needed to care for…outdoor environments," complementing instruction in academic subjects with "enough knowledge of nutrition to make informed personal choices about diet and health" (p. 9). After the NRC report, academics in agricultural education began to more clearly define agricultural literacy. The consensus definition for agricultural literacy established by Frick et al. (1991) added the ability to "synthesize, analyze, and communicate basic information about agriculture." (p. 52) They described as "basic agricultural information" such concepts as the economic impact and societal significance of agriculture, its relationship with natural resources and the environment, public policies, the global significance of agriculture, and the distribution of agricultural products.

In more recent times, the National Council on Agricultural Education included conversational literacy in agriculture, food, fiber, and natural resource systems as a goal in *Reinventing Agricultural Education for the Year 2020* (Team Ag Ed, 2000). To meet this goal, action items included the development of an education network and age-appropriate competencies reflecting conversational literacy in agriculture, food and fiber systems, and natural resource systems along with the development of an "appropriate agricultural literacy course and materials" with "strategies to ensure the successful completion of the course" (p. 8).

To clarify further what conversational literacy would entail, Trexler (2000) traced how the definition of literacy has changed over time in the American lexicon. He argued "if the agricultural education profession and its stakeholders are to foster agricultural literacy, then we must look to the policies and values we hold as we define the depth and breath of conversational literacy" (p. 5). In an empirical study published in 2003, Meischen and Trexler

articulated a linguistic development of literacy built around "culturally based beliefs, values and attitudes" leading to "the ability to make judgments based on culturally based norms" and asserted that "[a]griculture is a culture unto itself" (p. 43). Synthesizing this linguistic definition of literacy with the previously described threads of scientific, agricultural, and environmental knowledge-based literacy, Meischen and Trexler proposed an "updated" definition of agricultural literacy. Their definition entailed "knowledge and understanding of agriculturally-related scientific and technologically-based concepts and processes required for personal decision-making, participation in civic and cultural affairs, and economic productivity" (p. 44).

According to Meischen and Trexler (2003), agricultural literacy would go beyond familiarity with generalized concepts and processes and even beyond conversational literacy with agricultural facts and issues. They stressed the ability to make judgments and apply them to personal and public decision-making, which would focus the discussion of agricultural literacy onto an entirely different plane of deliberate values education. This education for values would become uniquely agricultural through the recognition and cultivation of a culture with a system of beliefs and values inherent to agriculture. A shift to values-based education for literacy would suggest the need for a move away from the traditional essentialist view of curriculum to one based more on a cognitive constructivist approach.

Overview of Three Agriculture Literacy Initiatives Relevant to the Conceptual Model

While the agricultural education establishment has been grappling with the task of defining agricultural literacy and attempting to build a consensus of need, several groups have forged ahead with programs to bring agricultural education into the classroom, especially at the primary grade levels where the need is great. Three notable efforts stand out as exemplary systematic efforts to incorporate agricultural education into existing classroom settings.

In 1981, the United States Department of Agriculture sponsored *Agriculture in the Classroom* (AITC), a "grass-roots" effort initiated by coalitions of state departments of agriculture and education, individual colleges of agriculture, local cooperative extension services, and farm organizations such as the Farm Bureau (B. Wolanyk, personal communication, July 27, 2004; Leising, Pense, & Portillo, 2003). Throughout the 1980s, AITC gradually consolidated in many states under the administration of the Farm Bureau (Agnew & McJunkin, 2005). Some states have little more than teacher training in a menu of activities embedding agricultural content into elementary school courses. Other states have fully developed curricula, systematically infusing agriculture into academic subject areas complete with teacher in-service training.

In 1988, Project Food, Land and People (FLP) began the development of a curriculum applying academic subject area knowledge and process skills in agricultural and environmental contexts. More than 1,600 professionals in science, social studies, math, agriculture, and the environment worked together for 10 years to develop and pilot-test lessons for an integrated curriculum (Project Food, Land, and People, 2003). Although the 55 FLP lesson units systematically integrate academic core subjects, fine arts, physical education, and health in a thematic study of agriculture, these lessons can also be implemented selectively to fit the scope and sequence of individual classroom curriculum.

In 1998, Leising, Igo, Heald, Hubert, and Yamamoto (1998) developed a systematic *Food and Fiber Systems Literacy* (FFSL) curriculum framework identifying five thematic areas of agricultural literacy. Each theme was further subdivided into standards and benchmarks by grade-level groupings. This systematic curriculum framework included a companion series of sample lesson units and a pilot-tested Food and Fiber Systems Literacy Test for assessing levels of agricultural knowledge against the benchmarks.

These three curricula represent complementary, rather than competitive, approaches to the common problem of systematically incorporating agricultural literacy in existing non-agricultural classes. AITC and FLP both attempt to reinforce an emergent body of agricultural literacy through the application of academic skills in an agricultural context. The agricultural knowledge and skills become real-life vehicles for academic learning. The FFSL curriculum framework takes the opposite tack of systematically infusing agricultural knowledge to build a programmed body of agricultural literacy. In this approach, the academic classes become the vehicles for agricultural learning.

Modeling the Interaction of the Elements: Building a Vision

What are the conceptual relationships between knowledge and process skills, values structures, and frameworks foci within the evolving agricultural literacy movement? If the end goal is to produce a critical and analytical thinker capable of discourse about, evaluation of, and decision-making in uniquely agricultural issues, does that, therefore, imply a linear or hierarchical model? In such a scheme, agricultural literacy resulting from a programmed infusion of agricultural knowledge into academic classes would appear to be of a lesser order of complexity and even desirability (Figure 1), while literacy "emerging" from application, analysis, and synthesis of academic skills in thematic units would appear to be of a "higher order;" and agriculturally literate value judgments would appear to be of the highest order.

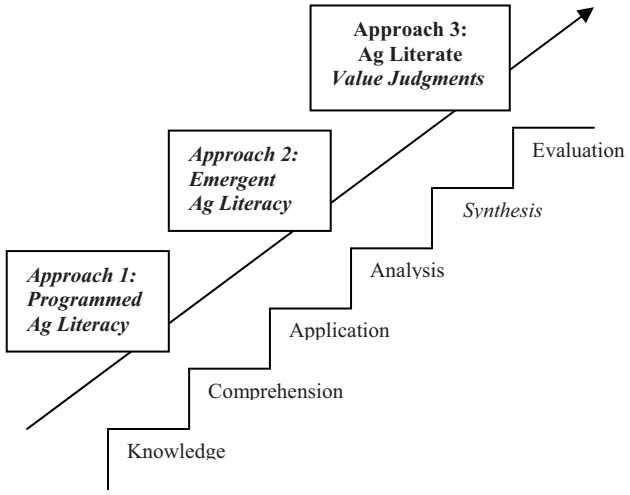

Figure 1. Linear/hierarchical model of agricultural literacy (modeled after Bloom, 1965).

The development of agriculturally literate value judgments, however, represents both an end goal and the means toward a goal in the epistemological process. Despite the taxonomic convenience of labeling sequential "levels" of cognitive skills, the actual cognitive process is neither linear nor hierarchical. It is more useful to consider these three elements as mutually interactive and synergistic rather than sequential. This interactive relationship would be more accurately portrayed as in Figure 2. Knowledge and process skills used to "build" emergent agricultural literacy provide the foundation for agriculturally literate value judgments that in turn influence the selection of knowledge and process skills. Value judgments are used to develop agricultural literacy frameworks that define programmed literacy, which in turn are used to assess and prioritize value judgments, placing them in a larger context. Similarly, frameworks unify and give perspective to knowledge and skills that build competencies.

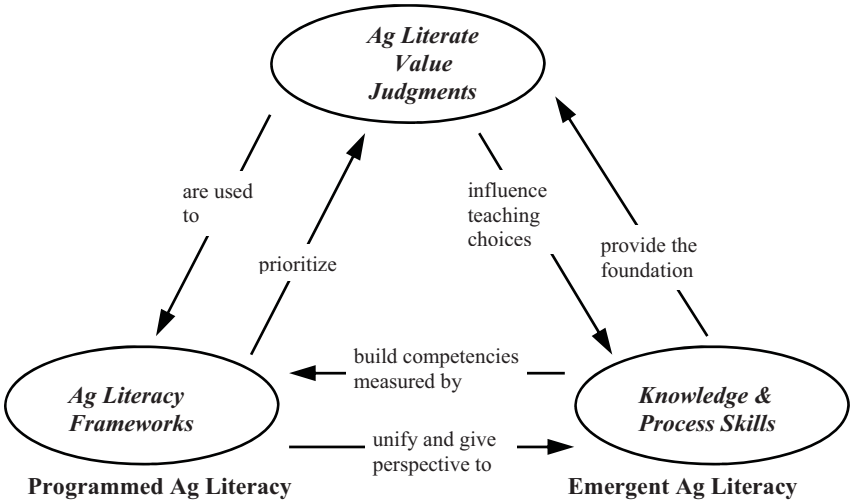

Figure 2. Interactive relationship between agricultural literacy values, knowledge, and frameworks.

Deductive and Inductive Curricular Approaches to Agricultural Literacy

Both the use of agricultural literacy frameworks ("programmed literacy") and the application of knowledge and process skills ("emergent literacy") can build agricultural literacy. The mechanism of each approach, however, works in an opposite direction. Programmed agricultural literacy built from a unified framework through standards and individual benchmarks, follows a deductive model (Tyler, 1949). After identifying the general objectives arising from the needs of students and society for knowledge related to agriculture, objectives are filtered through the educational and social philosophy of the school and pedagogical methods. Using pre-designed agricultural literacy frameworks incorporates part of the general academic core program and part of the career-technical program—including the overlapping portion where academic skills are applied to specifically agricultural topics—into a comprehensive programmed agricultural literacy curriculum (Figure 3a).

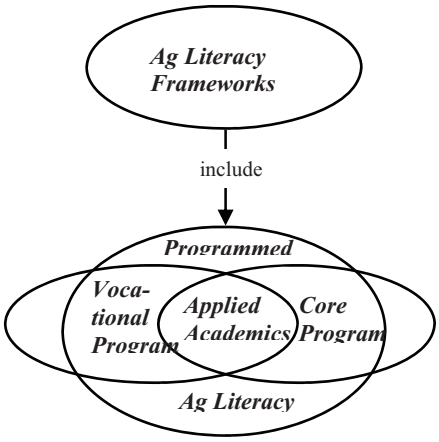

Figure 3a. Deductive model of developing agricultural literacy through frameworks.

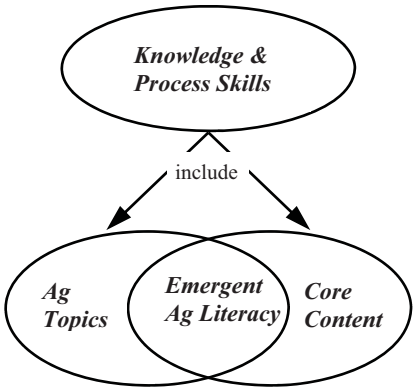

Figure 3b. Inductive model of emergent agricultural literacy.

Figure 3. Models for agricultural literacy.

Alternatively, an emergent agricultural literacy arises inductively through the application of knowledge and process skills from the core content into agricultural topics in contextual learning (Brown, 1998) (Figure 3b). This "grass-roots" curriculum development model, described by Taba (1962), follows an entirely different process, beginning with the production of pilot units tested to establish their validity and practicality before being revised and consolidated into blocks of units. Only then is a framework developed to provide the rationale for scope and sequence before installing and disseminating new units. Both AITC and FLP show the characteristics of this kind of evolution.

Evaluative Agricultural Literacy: A Process of Integration

Agricultural literacy arises both inductively and deductively. Inductively, agricultural literacy emerges from the application of knowledge and process skills to agricultural topics. Deductively, a programmed literacy framework emphasizes the infusion of agricultural topics throughout the academic subject areas. Both approaches are simply process models for the identification, organization, and application of facts and issues associated with agriculture. Either approach may or may not include behavioral objectives on the "synthesis" or "evaluation" level (Bloom, 1965), but the primary focus is to build a foundation of agricultural content.

Deliberate education for agricultural values integrates the agricultural content foundation into a deep understanding that "transforms factual information into usable knowledge" (Bransford, Brown, & Cocking, 2000, p. 16). Deep learning "always involves moving back and forth between a domain of thinking and a domain of action" (O'Neil, 1995, p. 20) Evaluative agricultural literacy arises by cultivating a system of beliefs and values (Meischen & Trexler, 2003) in which to "conditionalize" otherwise inert knowledge by the "specification of contexts in which it is useful" (Bransford et al., p. 43). However, a critical, analytical value system that is uniquely agricultural is interactive and synergistic, constructed through the application of knowledge and process skills unified and given perspective through the scaffolding of an agricultural literacy framework.

External Pressures: The Politics of Agricultural Literacy

Regardless of the process used for

curriculum development, the promotion of agricultural literacy does not occur in a vacuum. Two conflicting philosophical perspectives and resulting epistemological approaches act on this system from the outside (Figure 4).

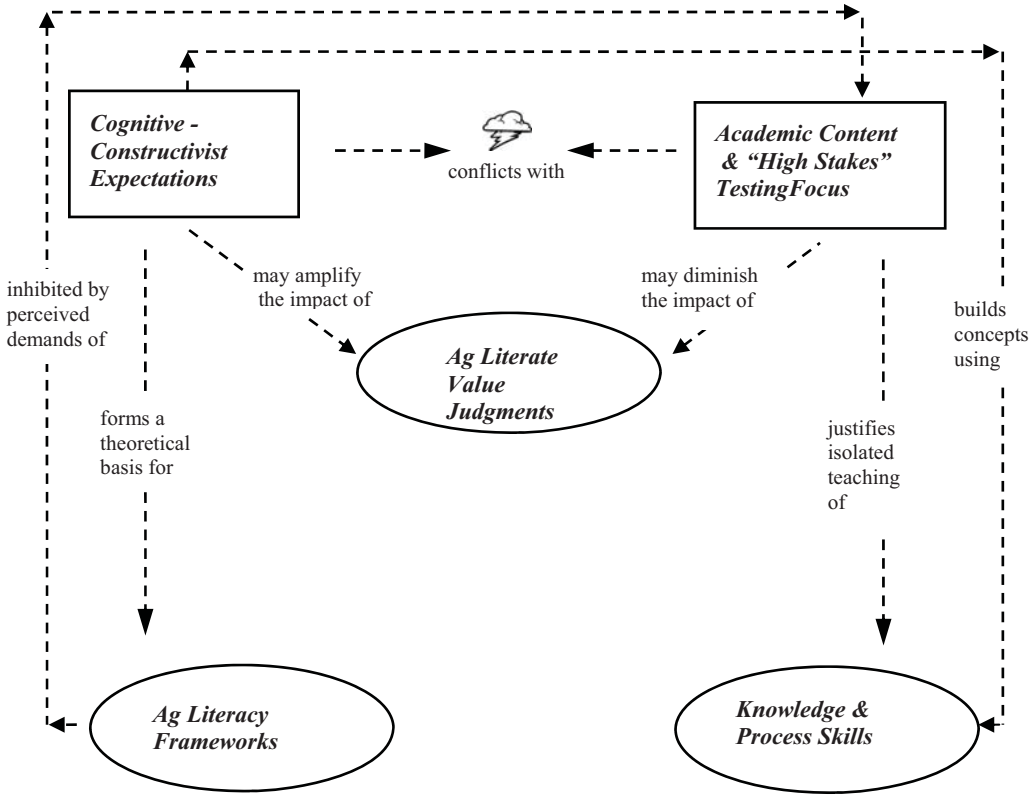

Figure 4. External pressures affecting the development of agricultural literacy.

According to King (2007, p. 44), "the single greatest impact [of No Child Left Behind] … is mandatory testing for academic proficiency in key subject areas [of reading and mathematics]." As King stated, the power this policy gives "to punish, reorganize or close schools whose test scores do not meet the standard of 'adequate yearly progress,' test preparation trumps all other aspects of classroom activity" (p. 44). The current emphasis on "traditional curriculum" with its attendant high stakes testing has been used to justify the short-term academic subject focus on core content knowledge and process skills. This external pressure arises from the public's desire to see immediate, measurable "progress," thereby devaluing non-core subject areas and topics that promote agricultural literacy. Because instructional time is already filled, this traditional essentialist focus may prevent the development of agriculturally literate value systems by inhibiting a perceived need for the programmed frameworks to help provide a conceptual scaffold of an agriculturally literate perspective.

In contrast, cognitive-constructivist theory has attempted to set up an expectation for interdisciplinary instruction to build concepts using knowledge and process skills in context. This cognitive-constructivist ideal is especially conducive to building agriculturally literate values systems, but it is constantly undermined by the necessity to meet mandated criterion-referenced testing goals in basic skills, resulting in a continuing conflict of interests between the agricultural literacy movement and the politically motivated requirements of public education.

Leverage Points for Change

Although emphases in practice may

differ, any of the three approaches—programmed, emergent, or evaluative—would be capable of promoting increases in agricultural literacy levels.

Combining all three approaches could build a literacy base that is more comprehensive and more completely integrated into the larger body of understanding acquired in a student's scholastic career. This is not a closed system, however. The disparate philosophical assumptions behind the public demand for traditional essentialist basic skills and the cognitive-constructivist expectation of "best practices" give rise to conflicting external pressures that disrupt the synergy of the common vision and the resultant effectiveness of its impact on agricultural literacy.

Figure 5 shows two key leverage points, ***A*** and ***A′,*** where the broader system's internal and external influences on agricultural literacy appear to be most susceptible to change. Both points involve strengthening cognitive-constructivist theory and practice *in the core content area classroom* As with the previous discussion of emergent and programmed agricultural literacy, these two leverage points represent deductive and inductive approaches to curricular change.

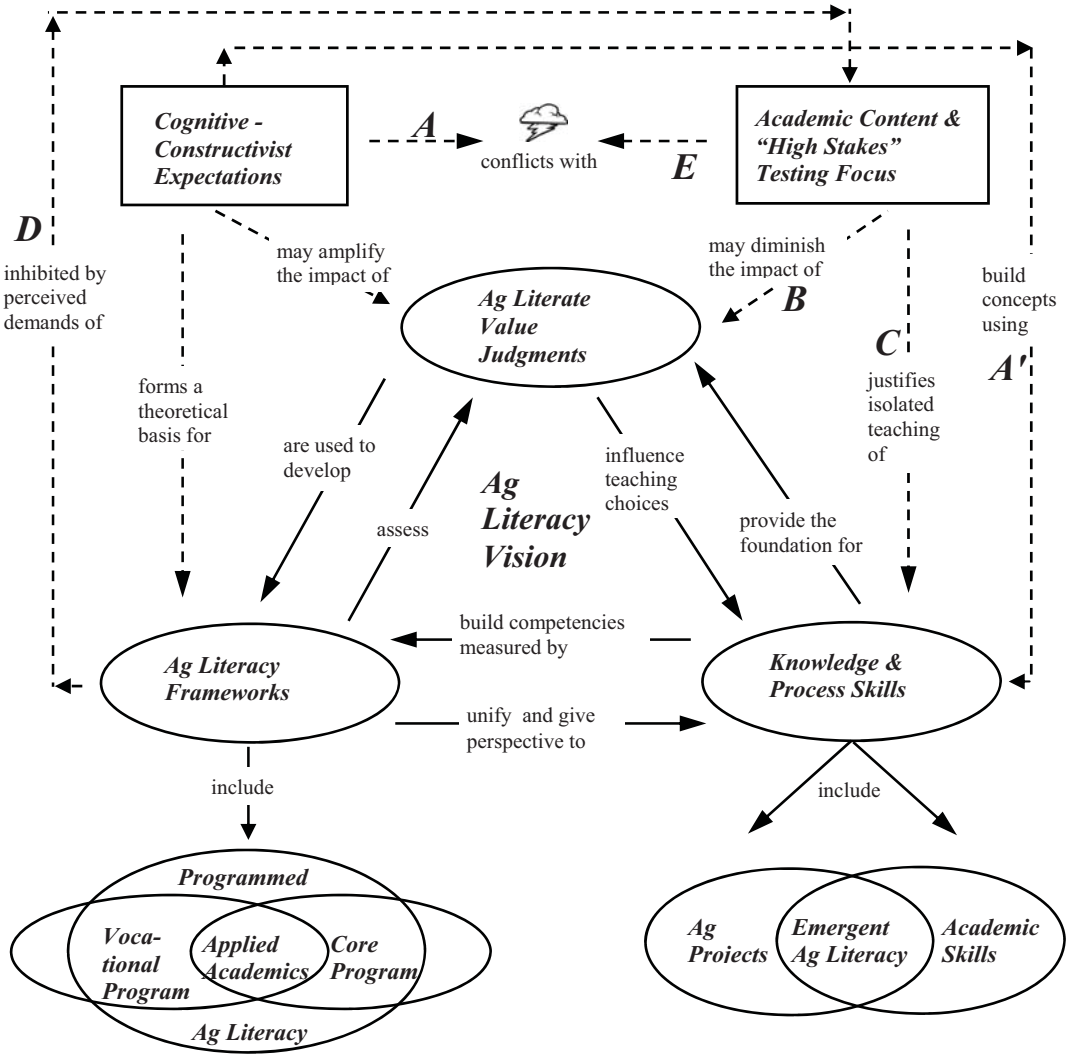

Figure 5. Agricultural literacy: Leverage points for change.

The deductive path to change begins at feedback loop ***A.*** This solution is more direct, but much more difficult to achieve, because it starts with a shift away from a traditional essentialist curricular focus and would necessitate a change in the testing paradigm. High-stakes testing does not, in and of itself, conflict with cognitive-constructivist teaching practices associated with agricultural literacy. If professional and political pressure urged changes to align the content and method of testing with cognitive-constructivist theory, then negative feedback loops that impede agricultural literacy would tend to become positive. Testing and instruction conducted from a constructivist perspective, stressing the use of integrative and evaluative expressions of knowledge could reinforce the impact of value judgments that are central for conversational agri-food system literacy ***(B).*** Instead of teaching basic skills out of context, a constructivist approach could promote the use of integrated multidisciplinary methods ***(C)*** increasing the perceived need for programmed agricultural literacy ***(D)***.

The inductive path beginning at feedback loop ***A'*** has the potential for long-term changes by working within the existing essentialist testing philosophy, promoting a change in the testing paradigm by strengthening core content outcomes. This "grass-roots" approach utilizes contextual teaching and learning in academic classes to promote agricultural literacy. A lesson-by-lesson integration of agricultural topics into the academic curriculum presents a natural context for the application and reinforcement of basic skill instruction. Systematic application of constructivist theory to basic skills instruction in the core content area classroom would incrementally change the way these skills and processes are integrated into a learner's schema, forging the connections needed for agriculturally literate value judgments. Not only could this improve the teaching and learning of basic skills, it could also gradually change the culture and curriculum of the K-12 classroom, thereby concomitantly promoting agricultural literacy.

An increasingly integrated knowledge base could erode the potentially negative impact of a traditional essentialist testing focus on the ability to formulate and express agriculturally literate value judgments ***(B***). Improved performance on tests, brought about by more refined constructivist teaching methodologies, could also erode the justification for teaching basic skills in isolation ***(C)***. As testing performance improves, the perceived need for programmed agricultural literacy might become more important ***(D)***, and the conflict between essentialist public demands and cognitive-constructivist teaching practices could eventually dissipate ***(E)***.

The traditional essentialist testing paradigm tends to suppress innovative teaching methods in favor of an exclusive focus on basic skills. Successfully integrating agricultural content into the curriculum *within the existing testing paradigm, however,* has the potential to raise test scores in basic skills. Improvements in a student's ability to make agriculturally literate value judgments could further strengthen the ability to analyze, synthesize and evaluate information. Improved test scores resulting from the incorporation of more contextual teaching methods could actually reverse the formerly negative feedback from external testing pressure (Figure 6), making agricultural literacy more valuable as a curriculum in its own right. This would justify a shift to a testing paradigm based on constructivist theory, assessing and reinforcing an integrative, evaluative construction of knowledge in context.

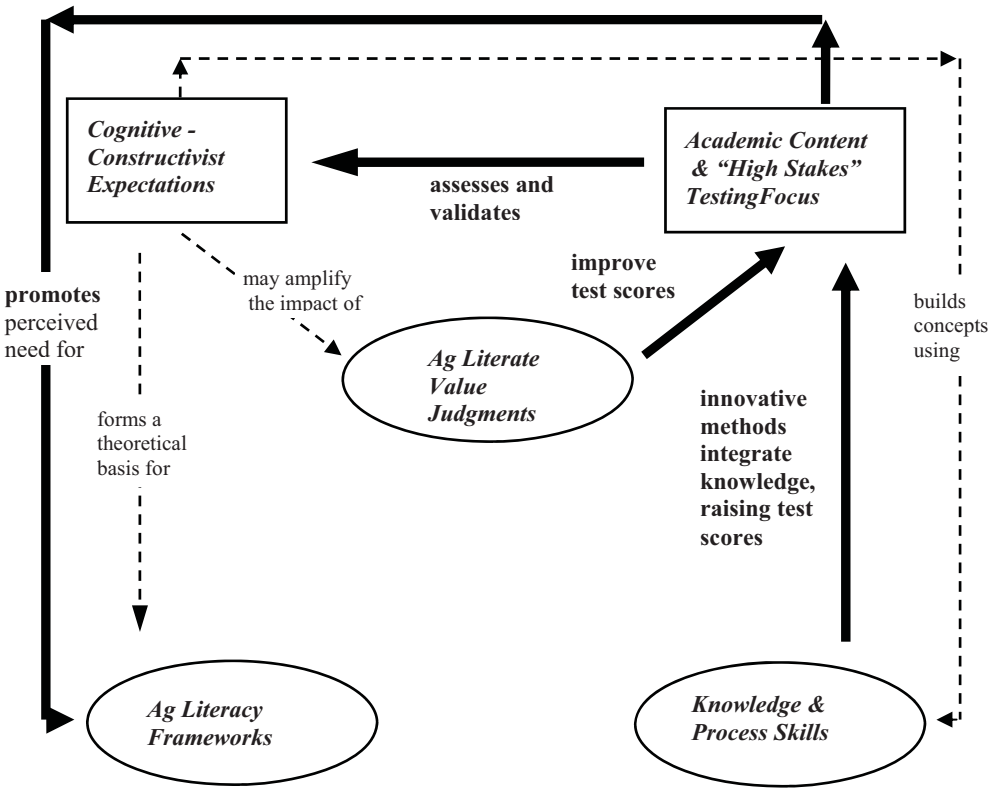

Figure 6. Paradigm shift promoting a shared vision of agricultural literacy.

Conclusions and Implications

This analysis identified three approaches (inductive, deductive, and evaluative) to a shared vision that promotes the cultivation and communication of a common knowledge base linked to agricultural issues. A conceptual model of the interactions between these aspects revealed the potential for positive, synergistic feedback that could build strong support from any one aspect for each of its counterparts. Conflicting external pressures exerted by public demands for a traditional essentialist curriculum with its attendant testing of basic facts and cognitive-constructivist expectations of "best practices" in educational methodology may have worked at cross-purposes, inhibiting the full potential of agricultural literacy efforts.

The conceptual model offered in this paper reveals two key leverage points for change by more fully integrating the use of constructivist methodologies. Although changing the testing paradigm might appear simpler, it would be more difficult to accomplish because national, state, and local political and social pressures would have to be overcome. Working to change the curriculum and testing process from a "grass roots" classroom level, although more time-consuming and less coordinated, could be accomplished incrementally within existing political and academic structures. As the educational establishment continues to evolve, the key elements of the shared vision are dynamic and could adapt to societal and cultural changes. Just as the use of a variety of teaching methods in the classroom is considered to be effective in teaching, the use of multiple approaches to the delivery of agricultural literacy content can also be effective and mutually reinforcing.

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