

Developing Agricultural Literacy Outcomes: A Synthesis of Research-based Expectations

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Introduction/Need for Research

In a recent meta-analysis conducted by Kovar and Ball (2013), analyzed 49 peer-reviewed articles on the topic of agricultural literacy published between 1988 and 2011. They found ten studies focused on K-12 teachers and 26 studies targeting K-12 students. In addition, they found seven studies that developed a framework or guide, 19 that evaluated programs, and 23 that assessed agricultural literacy generally. They concluded that “assessing agricultural literacy of a population and determining the effectiveness of a program are important goals” (p. 175); however, they noted that most agricultural literacy efforts are intermittent and varied, and they suggested that programs be more “national in scope” (p. 175) to determine impacts.

The American Association for Agricultural Education National Research Agenda (Roberts, Harder, & Brashears, Eds., 2016) establishes seven research priorities. Research Priority 1 outlines the need for research related to “Public and Policy Maker Understandings of Agriculture and Natural Resources” (p. 10). The research narrative on this priority states, “At the forefront of the discussion regarding public and policymaker understanding of agriculture and natural resources is the operationalization of what constitutes true agricultural literacy” (p. 14).

A great deal of agricultural literacy research has sought to answer questions about what K-12 teachers and students know about agriculture. In an effort to measure agricultural understandings, researchers have defined agricultural literacy, created instruments to measure understandings (Powell, Agnew & Trexler, 2008; Trexler & Hess 2004), and, to some extent, measured agricultural literacy related to standards and benchmarks (Hubert, Frank, & Igo, 2000; Igo & Frick, 1999; Pense & Leising, 2004). As Kovar and Ball (2013) noted there has been little consistency among researchers related to the measurement of agricultural literacy. In addition, none of the published frameworks connected understandings to content standards where curriculum might intersect agricultural concepts. This is essential as educators are required to cover these standards, not agricultural standards. Measurement is foundational to the development of models to operationalize agricultural understandings. This research is a synthesis of previous frameworks updating agricultural literacy benchmarks (Leising, Igo, Heald, Hubert, & Yamamoto, 1998) with explicit correlations to national science, social studies, and health education standards.

Conceptual Framework

In addition to the frameworks identified in the meta-analysis conducted by Kovar and Ball (2013), three additional frameworks were found (American Farm Bureau Foundation for Agriculture, 2012; Powell, Agnew, and Trexler, 2008; Wenzel, 2003). Nearly all of the frameworks were developed using modified Delphi methods (Dalkey, 1969). To develop a foundational framework with national scope, a constant comparison method (Gall, Gall, & Borg, 2015) was used as the conceptual framework to compare instances and discover commonalities among the frameworks. This qualitative analysis used frequency counts from previously published frameworks and guided the process for interpreting and correlating national education standards into themed National Agricultural Literacy Outcomes (NALOs).

Methodology

Using a content analysis rubric, concepts were unpacked from identified frameworks. Frequency counts were made on the items to determine the importance of the concepts. Concepts

with few instances were reviewed for relevancy related to current content standards. The *standards movement* in K-12 public education has required teachers to more effectively address core academic content. These correlations were essential to ensure the appropriate placement and relevancy of agricultural literacy outcomes within K-12 curriculum.

Concepts with a high frequency (noted on three or more frameworks) became part of a concept map and, from this map, five NALO themes emerged: Agriculture and the Environment; Plants and Animals for Food, Fiber and Energy; Food, Health, and Lifestyle; Science, Technology, Engineering and Math; Culture, Society, Economy and Geography. Each concept was written into a measurable outcome. To ensure outcomes were grade level appropriate, they were correlated with the national education standards in science (National Research Council, 2013), social studies (National Council for the Social Studies, 2010), and health (Centers for Disease Control and Prevention, 2013) using keyword searching. This evaluation resulted in the final grade level placement of each NALO. The draft NALO document was vetted through an online process by educators and researchers who were notified on three national list serves. The draft NALOs were viewed by 304 individuals. All comments were considered in the final document.

Results/Findings

The NALOs have been used as a framework to modify and develop over 250 curricular resources for the National Agriculture in the Classroom (NAITC) program (<http://www.agclassroom.org/matrix>). Over a six-month period, the NALO-integrated resources (as tracked by the researcher) have had over 35,000 page views. In addition, two graduate studies have been completed using the NALOs as a framework. Edwards (2016) found that 90% of the teachers engaged in her district's professional development wanted to learn more about the NALOs for integrating and contextualizing their teaching. In a second study conducted by Brandt (2016), instruments were developed to measure two NALO themes for students in grades 3-5. Brandt found the alignment to science standards made the NALOs easy to measure. She presented a viable theoretical construct for developing valid and reliable assessments for all NALOs and recommended improvements related to NALO and science standard terminology.

Conclusions

Researchers, curriculum developers, and educators have acknowledged the need for research-based, measurable agricultural literacy outcomes. The NALOs provide a foundation for creating instruments, developing instructional resources, and measuring baseline data that will provide consistency for measuring agricultural literacy models. Continued research on the NALOs is necessary to validate their content, appropriateness, and use as a baseline for measurement.

Implications

These foundational outcomes are an essential first step to measure with some consistency the delivery models used to *operationalize* and increase agricultural literacy. This synthesis work of outcomes correlated with national standards provides a research-based framework and an opportunity for those who wish to collaborate and conduct research in this area to address Priority 1 of the National Research Agenda for Agricultural Education.

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