

A Qualitative Analysis of Teachers' Conceptions of Agriculture

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Abstract

Teachers associated the agricultural industry with farming. They were not aware of the impact agriculture has on them or their involvement with the agricultural industry. This can be assumed about the teachers who participated in the 2008 Summer Agriculture Institute at Oregon State University. This study examined the teachers' conceptions of the agricultural industry prior to enrolling in SAU and how their conceptions changed throughout the program. The study used qualitative methods to interpret and analyze the data collected from entrance questionnaires, interviews and reflective journals. Entrance questionnaires and interviews established the participants' prior understanding of the agricultural industry. Data suggested the participants equated the agricultural industry with farming. From the reflective journal data it was determined not only were the teachers gaining an awareness of the vastness of the agricultural industry and agriculture is more than just farming there was a maturation in their knowledge held from prior to SAI. This study can help to further the effectiveness of SAI and other similar programs by noting where these programs could focus more attention in order to reach the goals set forth in the agricultural literacy movement.

Introduction

The term agricultural literacy was coined in the 1988 National Research Council's (NRC) report on agricultural education, *Understanding Agriculture: New Directions for Education*. The Council's (1988) definition of agricultural literacy determined an agriculturally literate person should have an understanding of agriculture from a historical, economic, social and environmental perspective. Since the publication of the NRC report, researchers have refined the term agricultural literacy and what it means to be agriculturally literate (Deeds, 1991; Elliot, 1999; Frick & Spotanski, 1990; Frick, Kahler, & Miller, 1991; Pope, 1990; Russel, McCracken, & Miller, 1990; Williams & White, 1991). Meischen and Trexler (2003) purposed an expanded definition of agricultural literacy which included agricultural content and a linguistics definition of literacy relative to culture. The following definition was chosen because it was the most comprehensive and determines the capacities of an agriculturally literate individual.

Agricultural literacy entails 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. At a minimum, if a person were literate about agriculture, food, fiber, and natural resource systems, he or she would be able to a) engage in social conversation, b) evaluate the validity of media, c) identify local, national, and international issues, and d) pose and evaluate arguments based on scientific evidence. Because agriculture is a unique culture, an understanding of beliefs and values inherent in agriculture should

also be included in a definition of agricultural literacy so people can become engaged in the system. (Meischen & Trexler, 2003, p. 44)

In response to the National Research Council's position on agricultural literacy, the Agricultural Education and General Agriculture department at Oregon State University in conjunction with the Oregon Farm Bureau developed an agricultural literacy program, Summer Agriculture Institute (SAI) to promote K-12 teachers in integrating agriculture into their curriculum (Balschweid, Thompson, & Cole, 1997). The 1997 study has shown the program to be effective insofar as the teachers who have participated are integrating agriculture into their curricula, and they have favorable self-reported perceptions of the agricultural industry (Balschweid, Thompson, & Cole, 1997). However, this study lacked an explanation of how the teachers' conceptions of agriculture have changed through their participation in the SAI and it has been the only study conducted on this agricultural literacy intervention.

Other researchers have studied teachers' perceptions of agriculture and have found teachers hold positive perceptions of agriculture (Elliot, 1999; Harris, Clark, & Birkenholz, 1996; Osbourne & Dyer, 1995). A qualitative study conducted on elementary and middle school teachers in Michigan found teachers' perceptions of the food and fiber system were mostly shaped by the media and primarily focused on food safety and nutrition (Trexler, Johnson, & Heinze, 2000). Unfortunately, Vestal and Briers (2000) reported metropolitan newspaper journalists have a "low" level of knowledge when it comes to biotechnology in agriculture. If this is a trend, it is vital to the success of the agricultural literacy movement to properly train the teachers who are implementing agricultural literacy curriculum in the classroom.

Summer Agriculture Institute was a week-long, three credit graduate course for elementary and secondary teachers who have had little to no experience in agriculture. The goal of SAI was to assist educators in using agriculture as a context for teaching mathematics, science, language arts, and social studies while maintaining educational standards. The participants were presented current, factual, and scientific information about agriculture. The participants were given the opportunity to meet the faces of agriculture and take many resources back to their classrooms. SAI is unique insofar as it offers participants the opportunity to spend 24 hours with a farm family. This experience is targeted to give participants to put a face with agriculture and to truly experience one day in the life of a farmer.

Agricultural literacy intervention programs, similar to Summer Agriculture Institute, can be a resource for teachers to be able to learn more about the agriculture industry. SAI provides teachers the opportunity to learn from various producers, agribusiness leaders and agricultural researchers. This program facilitates within teachers a basic understanding of agriculture and the ability to critically observe the agricultural information presented through mass media channels. With this in mind it is vital to the success of the program to determine what teachers are learning about agriculture through their participation in SAI.

Theoretical Foundation

The study used qualitative methods to investigate changes in teachers' conceptions of agriculture from participating in SAI. Before entering into a qualitative research project, the researcher must

determine the lens through which they are going to view the data. Lincoln and Guba (1998) stated qualitative research is viewed through a paradigmatic lens; such paradigms are a belief system which is supported on ontological, epistemological, and methodological assumptions.

The constructionist epistemology follows many assumptions of the relativist ontology (Lincoln & Guba, 1998). Such an epistemology assumes the nature of knowledge is constructed by human beings as they interact with the world around them (Crotty, 1998, p. 43). Following the assumptions of relativism, as the human mind develops, realities are constantly changing. For example, a person will have a predisposition to agriculture and as they begin to inquire, their understanding of agriculture develops and a reconstruction of their prior scaffolding occurs. Thus, multiple realities can exist and are subject to constant revision (Lincoln & Guba, 1998).

Relating such an epistemological stance to agricultural literacy and SAI, a teacher might come into the program with certain assumptions and perceptions of agriculture, such as all conventional farms are large cooperate-owned farms that do not care about the environment. It is the aim of inquiry to provide a sophistication of the initial perceptions held by the inquirer or learner (Lincoln & Guba, 1998). It is the aim of SAI to reconstruct and co-construct their understanding of agriculture and change their perceptions of the agricultural industry.

The theoretical perspective which informs the methodology and data analysis of this study was closely aligned with that of symbolic interactionism. There are three basic assumptions which underscore symbolic interactionism and this study: (a) people act toward things according to the meaning they have for them, (b) meaning is derived from and arises out of social interaction, and (c) meanings are modified in an interpretive process with the things and individual encounters (Crotty, 1998). This perspective enlightens the ethnographic methods used in this study. In ethnographic studies the researcher is familiar with the social settings being studied, however must treat it as anthropologically strange in order to get inside the way each group of people sees the world (Crotty, 1998).

Conceptual Framework

Driver (1995) argued students develop concepts of natural phenomena before they are taught science in the school setting. It can be hypothesized the same is true for agriculture. Individuals have already developed concepts of the agricultural industry prior to receiving any instruction. Constructivist school of thought proposes an individual will have built a mental model of their natural surroundings; new ideas are then assimilated into those mental models (Posner, Strike, Hewson, & Gertzog, 1982). The participants in SAI each enter into the program with a mental model of what agriculture means to them, such as viewing a farmer as a middle-aged, white male who wears overalls and tends to livestock in a big red barn. Through participation in SAI, new knowledge would then be assimilated into previously constructed models. In alignment with the nature of knowledge discussed above, each of the participants had different mental models of agriculture. A goal of the study was to determine if patterns emerge from the participants unique mental models of agriculture.

Frick, Kahler, and Martin (1991) proposed an agriculturally literate member of society should have a basic understanding of agriculture. The study determined there are eleven concept areas

to agriculture (Table 1) and to be considered literate in agriculture, one must have a basic understanding of each concept area. This study used the agricultural literacy concepts as a framework for analyzing the data produced in the study.

Table 1.

Eleven Agricultural Literacy Concepts and Their Respective Sub-concepts (Frick, et. al, 1991)

Concept area	Sub-Concept
Agriculture's important relationship with the environment.	The agriculturalists role in protecting the environment Opinions and perceptions Chemicals Positive/Negative effects of agriculture on the environment Relationship of the environment and agriculture Sustainable agriculture
The processing of agricultural products.	Steps and complexity of processing Importance of processing and value-added products Food safety Product development and technology
Public agricultural policy.	Government policy impact on industry Unaware public/ consumer The government's role and limitation regarding agricultural policy
Agriculture's important relationship with natural resources.	Conservation of natural resources Sustainable agriculture Stewardship of agriculture pollution and depletion of our natural resources Codependent relationship between agriculture and natural resources Importance for agriculture
Production of animal products.	Consumer concerns The uses and roles of various animal species Biotechnology and genetics Animal husbandry
Societal significance of agriculture.	Society's lack of awareness Agriculture's effect on society Rural life Social benefits Food efficiency

Table 1 Continued on next page.

Table 1 (continued)

Concept area	Sub-Concept
Production of plant products.	Greenhouses/ Gardens Use and care for plants Agronomic practices Biotechnology, biology and genetics Profit Society
Economic impact of agriculture.	Macroeconomics and microeconomics Farm management Economic benefits and food costs
The marketing of agricultural products.	Marketing plan and strategy Global marketing Agriculture's function in a market-oriented economy Public perception
The distribution of agricultural products.	The distribution system and its importance Global distribution and hunger Cost of distribution Efficiency of distribution Distribution sector employment
The global significance of agriculture.	Global food economics Global hunger and food distribution Technology and university research Global politics and sociology

Purpose and Objectives

The purpose of this study was to examine participants' conceptions of agriculture prior to participating in an agricultural literacy intervention and determine how those conceptions changed during their experience. The study was concerned with two primary objectives: (a) determine the agricultural literacy concepts held by the participants prior to Summer Agriculture Institute. (b) determine the changes in agricultural literacy concepts held by the participants during Summer Agriculture Institute.

Methods and Procedures

The population for this study included elementary and secondary education teachers enrolled in the 2008 Summer Agriculture Institute held at Oregon State University. The 14 participants were randomly selected from list of 25 teachers enrolled in the program. The participants of the Summer Agriculture Institute ranged from Pre-kindergarten to high school teachers.

Throughout SAI the researcher participated in a majority of the program, experiencing the program with the participants. This helped to build the rapport of the researcher with the participants. It is important to build rapport and gain the trust of the participants to truly understand them (Fontana & Frey, 1998). Thus, the participants would conceivably feel more comfortable writing their true thoughts about agriculture and not what they think the researcher wants to hear.

Qualitative methods were selected for this study because the researchers desired a descriptive set of rich data which explored the research questions. This study focused on elementary and secondary school teachers during their participation in the Summer Agriculture Institute to ascertain the agricultural literacy concepts learned through their participation. Learning was defined by the appearance of the agricultural literacy concepts in their writing. During their participation the data was collected through entrance questionnaires, interviews, and reflective journals.

Data Collection

Entrance questionnaire.

On the application for Summer Agriculture Institute each of the participants were asked to give their definition of agriculture. Participants also completed an entrance questionnaire upon arrival to Summer Agriculture Institute. The questionnaire consisted of five open ended questions: (a) When you think of the US agriculture and the food and fiber system, what comes to mind? (b) Is it important for your students to understand agriculture? Why? (c) Where do you get information about agriculture? (d) What do you feel your role as an educator is in educating students about agriculture? (e) What do you teach about agriculture right now? The questionnaire was intended to gather data on the teachers' initial conceptions of agriculture and additional information requested by the SAI staff.

Teacher interviews.

There was a set of formal, semi structured teacher interviews. The interviews were audio taped and transcribed to allow for the thorough collection of rich data. The interviews took place upon the teachers' arrival to the Summer Agriculture Institute. This interview consisted of several open ended questions about their understanding of agriculture; desire to learn more about agriculture, and how they plan on using the skills and knowledge gained through SAI in their classrooms. The following questions were used as a guide for the interviews:

- In your own words describe what a farm looks like.
- In your own words describe what a farmer does.
- In your own words describe what the agricultural industry looks like.
- What do you feel your students should know about agriculture?
- Have you ever taught agricultural concepts?
- Where do you get information about agriculture?
- What do you hope to learn from SAI?

Reflective journals.

Each night during the SAI experience, the participants were asked to reflect upon their experiences. The participants were given two prompts to reflect upon; what did I learn about agriculture today and how can I use this in my classroom? The journals provided the researchers

a means to more fully understand the participants' level of understanding of agriculture and determine the maturation of the participants' perceptions of agriculture.

Data Analysis

All of the data were coded to allow for ease of analysis. Topic coding and analytical coding (Richards, 2005) were used to reduce the data into categories. Each data source was topically coded for the eleven agricultural literacy concepts. Each of the coded items was then coded for the level of understanding. The codes of awareness, basic understanding, and deep understanding were used to differentiate responses. The agricultural literacy sub-concepts (discussed in Table 1) were used to determine the level of understanding. For example, if a participant mentioned that agriculture had a large impact on the community, but did not go any further, the response would be coded for an awareness of economic impact. If the respondent went into greater detail, it would be coded for a basic understanding. Using economic impact as an example, the respondent may mention that agriculture has a significant impact on the economy and give an example where prices for commodities on the farm would affect the prices of food in the stores. To have a deep understanding the respondent would have given an example how farm prices of one commodity, crude oil, could affect the price of other commodities, corn, thus raising the price of food in the marketplace and the cost of ethanol blended fuels at the gas pumps.

As an example of the coding system used in the entrance questionnaires, the definitions of two teachers were analyzed in Table 2. The first definition of agriculture contains three parts; production of plant products, production of animal products, and relationship with natural resources. The definition mentioned three different agricultural concepts, however the participant's definition was superficial and did not demonstrate a deep understanding of agricultural industry and was therefore coded at the awareness level. The second definition only contained two concepts and was even more superficial in understanding in comparison to the first definition.

Table 2.
Participant Definitions of Agriculture

ID	Definition	Code	Level	Code	Level	Code	Level
CG	The practice and study of crops, livestock, and land management	Plant	Awareness	Animal	Awareness	Natural Resources	Awareness
KC	The industry of farming- land or livestock	Plant	Awareness	Animal	Awareness		

Following coding, a descriptive analysis was conducted to determine what themes were emerging from the data (Huberman & Miles, 1998). To uncover the changes in conceptions, the data was examined chronologically from each participant. Entrance questionnaires and teacher interview data were used to determine teachers' initial conceptions of the agricultural industry. Data analyzed from the reflective journals were used to determine changes in conceptions. The

researchers then examined the data to find patterns which emerged from the changes in conceptions.

Validity Issues

Dooley (2007) stated that trustworthiness is the level at which the findings of the study accurately represent the respondents and their contexts. She also noted to achieve internal validity or credibility of a study; the researcher must represent the multiple realities accurately. Triangulation of data collection methods reduces the chances the conclusions will contain systemic bias or reflect the limitations of a specific data collection method (Gall, Gall & Borg, 2005).

This study used methodological triangulation (Denzin, 1970) by analyzing data collected from entrance questionnaires, interviews, and reflective journals to validate conclusions. In order to obtain investigator triangulation (Denzin, 1970) the study used three independent researchers who coded each of the data sources and individually analyzed the data prior to collaboration. Two of the researchers were directly involved in the program; the third researcher was independent of the program. The third researcher was used to account for any bias the researchers had from participating in Summer Agriculture Institute along with the participants. Additionally, the researchers used participant observations to confirm the teachers' statements and reduce self-reported bias in the teacher interviews.

The bias of a researcher can skew the results of a study (Gall, Gall, & Borg, 2005). It is important for a qualitative researcher to state their bias in order to understand how the researcher's values can influence the findings and conclusions of a study (Maxwell, 1941). The researchers are all part of the agricultural education community and believe that it is important for individuals to have a basic understanding of agriculture. The researchers were aware that the selection of teachers with little to no experience in agriculture enrolled in the Summer Agriculture Institute were going to show gains in understanding of the agricultural industry, in order to minimize any selection bias, the researchers' randomly selected participants. Additionally, the researchers' utilized the eleven agricultural literacy concepts as a framework for coding the data to minimize any bias in data analysis.

Findings

Quotations from participants were used as evidence to support the results of the study. Initials were used to protect the anonymity of the participants.

Conceptions of Agriculture

Application definition.

On the application for Summer Agriculture Institute the participants were asked to define agriculture in their own words. This definition demonstrated the prior knowledge and conceptions of the teachers toward agriculture. The data was coded and analyzed to determine how the teachers as a whole defined agriculture, and to serve as a benchmark for initial understanding in order to examine the rest of the data.

Table 3 categorizes the definitions of agriculture from the participants into awareness and basic understanding. All of the participants noted plants in their definition and 12 mentioned the raising of livestock. The production of plants and animals are the basic concepts which one would generally associate with farming. It was evident the participants definition of agriculture was strongly influenced by production agriculture or farming. Therefore it can be assumed that upon entering into the Summer Agriculture Institute the participants equated the agricultural industry with farming.

Table 3.

Level of Understanding of Agricultural Literacy Concepts in Participant Definitions.

	Awareness	Basic Understanding
Plant Production	10	4
Animal Production	10	2
Economic Impacts	3	0
Relationship with Natural Resources	1	0
Marketing	1	0

Note. n = 14.

Noting the overwhelming notion suggesting agriculture is farming, the researchers desired to further examine the participants' conception of farming and the agricultural industry. On the entrance questionnaire, the participants were asked the question; when you think of the U.S. food and fiber system, what comes to mind? This question was aimed at obtaining more information regarding the participants' conceptions of agriculture and to confirm the findings from their initial definition of agriculture. The researchers wanted to determine if there was a deeper understanding of the agricultural industry and if the teachers' conceptions encompassed more than farming.

Entrance questionnaire.

The first item on the questionnaire asked the participants to write down what came to mind when they thought of the food and fiber system. This question had a greater variety of responses than the definition of agriculture on the application (Table 4). Three of the participants directly

Table 4.

Level of Understanding of Agricultural Literacy Concepts in Participant Responses to Food and Fiber System.

	Awareness	Basic Understanding
Plant Production	7	0
Animal Production	7	0
Public Policy	4	0
Societal Significance	3	1
Processing	2	0

Note. n=14

mentioned regulations, but did not elaborate as to the extent of the role of regulations in agriculture. Three other participants mentioned balanced nutrition, food choices, and school lunch programs. The responses portrayed the participants' awareness of some of the societal impacts of agriculture. However, half of the respondents once again solely mentioned the production of plants and animals. The one response which demonstrated a basic understanding equated agriculture with life, "without it we would not exist" (MS). Through participant observations the researchers were able to verify the participants' basic understanding of the societal significance of agricultural.

Interviews.

The data from the previous two sources suggested the participants' conception of the industry equated agriculture with farming. Wanting to more deeply examine the participants' concepts on production agriculture the researchers asked questions to gather additional data on the distinction between farming and the agricultural industry. The participants were asked what they thought a farm looks like, what a farmer does, and what they thought of in regards to the agricultural industry.

The first question in the interview asked the participants to describe what they thought a farm looked like. One of the participants could not begin to describe what a farm would look like, and did not respond to the question. Five of the participants' responses were very superficial at defining a farm. One participant responded, "When I think of a farm, I think of a big red barn" (JL). Another responded with "I think all I know about a farm is what I've seen on TV, Little House on the Prairie like" (SV). The other eight participants were a little more in depth with their responses and noted the variety of production, size of the farm, and production methods. The researchers considered four of the participants to have a basic understanding of production agriculture.

When asked about the agricultural industry, eleven of the fourteen participants restated their original claims associating agriculture with farming. The other three participants all referenced that the agricultural industry is larger than it appears to most people. Table 5 shows the responses of the three participants who elaborated on the vastness of the agricultural industry. Because of the difference in explanations, the researchers examined the background of these three participants to determine what would separate them from the other SAI participants. Each of these participants had past agriculture experience. GK and MS both grew up on family farms and GA has a university degree in animal sciences. The researchers believed this could be the reason for the three participants having a basic understanding of the vastness of the industry.

Through the three sources used to obtain the participants' initial conceptions of agriculture; it is clear each of the participants have their unique model of what agriculture is to them. As the researchers examined all of the evidence, the data suggests the participants mainly see the agricultural industry as farming. The reflective journals were used to establish if there was maturation in conceptions held by the participants.

Table 5.

Participant Responses to Appearance of the Agricultural Industry.

ID	Response
GK	The agriculture industry is a business, supply and demand and hopefully the goal is to feed people and good food and products. It works a lot like a normal business.
GA	I think it's real diverse and I don't think people understand how diverse it is and it goes from what you do in the morning to what you slip into at night time to what you eat to what you wear. It's not just USDA it's so many things that I don't think people have a clue, personally.
MS	[The agricultural industry] is bigger than we see on the surface because it is more than the farm that you drive by. There are a lot of different extensions to it and I mean that it is linked to almost everything that we are a part of in some way or another.

Changes in Conceptions

From the previous data sources it was evident a majority of the participants were only aware of the production aspect of the agricultural industry. The participants were asked to write what they learned about agriculture each day. In order to test the second objective of the study, what were the conceptions of agriculture held by the participants during SAI; the researchers combed through the participants daily journals to find evidence of the participant's knowledge of the agricultural industry. The data were coded for the eleven agricultural literacy concepts. After coding, the data were examined to determine if there was a maturation of knowledge by the participant. Table 6 shows the participants' level of understanding of each of the eleven concept areas of agricultural literacy.

Table 6.

Participants' level of understanding of the eleven agricultural literacy concept areas after participation in SAI organized by level of basic understanding then awareness.

	Awareness	Basic Understanding	Deep Understanding
Production of plant products.	9	5	0
Agriculture's important relationship with the environment.	7	2	0
The global significance of agriculture.	4	2	0
Production of animal products.	10	1	0
Economic impact of agriculture.	5	1	0
The processing of agricultural products.	10	0	0
Societal significance of agriculture.	6	0	0

Table 6 continued on next page.

Table 6 (continued)

	Awareness	Basic Understanding	Deep Understanding
The marketing of agricultural products.	4	0	0
Agriculture's important relationship with natural resources.	3	0	0
Public agricultural policy.	0	0	0
The distribution of agricultural products.	0	0	0

Note. n=14

Conclusions and Recommendations

Through participation in Summer Agriculture Institute, it was evident the teachers enrolled in the program were becoming more agriculturally literate citizens. According to Meischen and Trexler's (2003) definition of an agriculturally literate person, he or she should be able to: a) engage in social conversation, b) evaluate the validity of media, c) identify local, national, and international issues, and d) pose and evaluate arguments based on scientific evidence. In order to be considered an agriculturally literate individual one must meet these criteria for each of the 11 agricultural literacy concept areas.

Evidence suggests, prior to enrolling in SAI the teachers' who participated in the study had only a minimal awareness of the agricultural industry. The participants' conceptions mainly consisted of plant and animal production. However, a few of the teachers were aware of economic impact (3), relationship with natural resources (1), marketing (1), processing (2), public policy (4), and the societal significance of agriculture (3). Members of the agricultural industry know the industry reaches far beyond mere crop and animal production.

As the SAI experience progressed it was evident the teachers were becoming more aware of the agricultural industry. The data showed both an increase in awareness of the vastness of the industry and a maturation of understanding of the agricultural literacy concepts. The participants showed awareness in all of the concept areas except public policy and distribution of agricultural products. A few of the participants showed a basic understanding in five of the concept areas; agriculture's relationship with the environment (2), production of plant (5) and animal products (1), economic impact of the agricultural industry (1), and the global significance of agriculture (2).

This study suggests the Summer Agriculture Institute is making progress toward developing agriculturally literate teachers. The participants in this study demonstrated an increase in awareness and maturation in their understanding of agriculture. However, there is still room for improvement for SAI. It was apparent SAI focuses heavily on the production of plant and animal products in their curriculum. Understandably, it is difficult to shy away from those concept areas with the diversity of plant and animal products produced in Oregon. It is

imperative to determine the level of importance of each of the concept areas to determine which should receive the most attention in time-limited agricultural literacy interventions.

A limitation of this study was the fact it only focused on the teachers from one year who participated in SAI and only included data gathered during their participation in the program. In order to truly determine the effectiveness of this program it would be essential to observe the effects of participation on the teachers' curriculum and agricultural literacy levels of their students. Future qualitative research should follow these teachers from their participation in SAI back to their classrooms. Additional interviews should be conducted to explore: (a) their conceptions of the agricultural industry after participation, (b) how they have infused agriculture into their lessons, and (c) how they have continued to learn about agriculture. In addition to interviews, it would also be important to make classroom observations and examine lesson plans for agricultural content.

A study should be conducted to examine the effect of teacher participation in agricultural literacy programs. How does teacher participation in agricultural literacy interventions affect the students' awareness and appreciation of agriculture? Pretest/posttest quantitative methods and interviews should be conducted to ascertain this information.

A unique aspect of the Summer Agriculture Institute is an overnight stay with a farm family. A study should be conducted to examine how this experience differs from participation in the rest of the program. Are teachers obtaining a deeper understanding of agriculture from this experience or is this solely an affective learning experience?

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