

ELEMENTARY AND MIDDLE SCHOOL TEACHER IDEAS ABOUT THE AGRI-FOOD SYSTEM AND THEIR EVALUATION OF AGRI-SYSTEM STAKEHOLDERS' SUGGESTIONS FOR EDUCATION

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Abstract

Three focus groups were conducted with Michigan 2nd-8th grade educators to assess teacher perceptions of the US agri-foodsystem, their thoughts on the importance of teaching about the system, what is currently being taught about the system, existing sources of agri-food system information, and external stakeholder recommendations for content and delivery of agri-food system education. The study concluded that educators emphasize the nutritional and health aspects of the agri-food system and are less knowledgeable about agriculture. Most generally agricultural education is taught as farming in the early elementary years, whereas in later grades nutrition information dominates instruction. Educators found it important that youth understand the food production and consumption system in order to make well-reasoned decisions regarding personal health and the environment. Teachers were receptive to more fully integrating agri-foodsystem education into existing curriculums and would teach such material if adequate support was given and if the content complemented existing State educational goals.

Introduction

In the early 1990s, the Michigan Integrated Food and Farming System (MIFFS) was launched as part of the 18-state W.K. Kellogg Foundation's "Integrated Farming Systems" program. MIFFS was formed to create and support healthier food and farming systems. While pursuing this goal, frustrations led many MIFFS members to conclude that society lacks a basic understanding of how food is produced and, therefore, does not value a sustainable food system. This concern is echoed by sociologists Thompson (1995) and Wilkins (1995) who argue that for sustainable practices to take hold, consumers--who drive production practices through their consumption of food and fiber products--must have a basic understanding of their role in the agri-food system. During meetings in 1997, MIFFS members suggested that increased food system education in the schools

was needed before society could make more informed choices about the food they consume.

These suggestions are similar to the National Research Council (1988) assertion that agriculture is too important to be taught to only students in vocational education. It urged that more agriculture be taught in the country's schools. Agricultural educators advocate a broader role for agricultural concepts in U.S. public school curricula (Balschweid, Thompson, & Cole, 1998; Frick, Birkenholz, Gardner, & Machtmes, 1995). Vahoviak and Etling (1994) extend the discipline even further by suggesting that "agricultural education, with linkages to environmental education, could foster an educational philosophy with global sustainability as its focus" (p. 13).

Leising and Zilbert (1994) identified a lack

of statewide systematic planning to provide direction in developing curricula about the food and fiber system. Nurturing support for development of and agreement on curricular goals is a political process. Marris (1974) suggested that curriculum development requires the involvement of the multiple stakeholders to promote ownership of the innovation.

Theoretical Framework

This research initially sought to determine if suggestions made by agri-food system stakeholders for public school curriculum innovations were reasonable to their ultimate consumers--teachers. This seemed advisable because teachers are the primary change agents in the implementation of new curricula (US Department of Education, 1994). Fishbein and Ajzen's (1975) work in determining intentions to participate set the theoretical framework. They argued that one's knowledge, observation, or other information about an issue could predict intention to participate. Greenwald (1989) supported this theory, reporting that individuals with positive attitudes toward a subject or situation tend to evaluate them positively. This suggested that teachers' intents to consume educational products and utilize corresponding support systems could be gauged by analyzing beliefs about these innovations in a social setting, because most decisions in school settings are heavily influenced by groups.

This study's conceptual framework involved two phases. In the first, stakeholder groups--representing agricultural commodity associations, farmers, environmentalists, nutritionists, and health educators--met in roundtable meetings. Roundtable participants worked in small groups, structured to reflect their diversity of interests and beliefs, to propose agri-food system content and educational strategies. Participants suggested schools/teachers should play a central role in educating young people by: 1) integrating food

and agri-food system themes and examples into social studies, science, mathematics, English, and health curriculums; 2) connecting the agri-food system to environmental and social issues; 3) involving students in real-world experiences in the agri-food system; 4) using media to enhance instruction about food and the agri-food system; and 5) enhancing critical thinking skills by analyzing food choices and the inter-relationships within the agri-food system. Realizing that teachers are consumers of educational products for delivery to students, the second phase of the conceptual framework--and focus of this paper--solicited teacher perceptions of stakeholder suggestions for sustainable agri-food system education.

Purpose and Objectives

This study's purpose was to develop recommendations for products and systems to educate students about sustainable agri-food systems in Michigan. To meet this goal, specific objectives were:

1. To determine teachers' ideas about and perceptions of the U.S. agri-food system.
2. To ascertain teachers' perceptions of the importance of agri-food system education.
3. To determine what is taught about the agri-food system in 2nd-8th grade classrooms,
4. To determine where teachers believe students acquire information about the agri-food system.
5. To evaluate recommendations from the MIFFS' Roundtables relative to agri-food system subject matter and teaching methods.
6. To solicit insights from teachers about the educational products and systems for delivery needed to implement MIFFS Roundtable recommendations.

Methods and Procedures

The population for this focus group study was all 2nd-5th grade teachers and 6th-8th grade teachers of science and social science in three contiguous counties (Ingham, Clinton and Eaton) surrounding Michigan's capitol city, Lansing. This totaled over 3,000 elementary and middle school teachers. Second through fifth grade teachers were selected because they often teach in self-contained classrooms and are responsible for all subjects, whereas science and social studies teachers were selected because the researchers believed they were more likely to teach about the agri-food system than other subject matter specialists.

Focus group participants were randomly selected from the three counties. Because the counties differed in their populations and geographic make-ups, the researchers determined the proportionality of each county's schools composing the total population of schools meeting the elementary and middle school criteria. Based on these criteria, a sample of 32 schools (70%) was selected from urban and suburban Ingham County, 6 schools (13%) from suburban and rural Clinton County, and 8 schools (17%) from suburban and rural Eaton County. With these sample schools chosen, elementary and middle school teachers were selected randomly.

This process resulted in a sample of eighty 2nd-8th grade teachers. In four schools (3 in Ingham County and 1 in Eaton County), researchers were unable to obtain any names for invitation; the missing schools were either private schools or public school academies. Invitations were mailed to all 80 teachers asking them to attend one of three evening focus groups scheduled between March 31 and April 2, 1998. To provide an incentive for participation (Krueger, 1994), teachers were offered a \$50 stipend and dinner for participation. Reservations were requested and confirmed.

Krueger (1994) suggests that focus group

should be homogeneous and should range in size from 4 to 12 participants to allow opportunity for individuals to talk and to provide for practical logistics and management. In this study, the three focus groups fell within this range, with 7, 6 and 9 teachers participating, respectively. Although researchers sought to select a representative sample of teachers based on the geographic locale of the schools, 47% of the teachers represented came from rural schools, 39% from urban schools, and 13% from suburban schools. As with all focus groups, attendance is voluntarily fueled by personal interest.

A series of three 90-minute focus groups were conducted to detect patterns and trends across the groups. This also served to increase the chances for a saturated response (Strauss, 1987). Interviews were audio taped and transcribed, serving as the primary data sources. Field notes and any products created by the interviewees were consulted as secondary data.

Each focus group followed a format similar to that outlined by Merton, Fiske, & Kendall (1990). Two researchers attended each focus group. One moderated the interview while the other took field notes. Interview questions were structured around three areas: 1) conceptions of the agri-food system, 2) education about the agri-food system, and 3) reactions to the MIFFS agri-food system education roundtable suggestions. The questions' content validity was assessed by faculty from Michigan State University's Department of Agricultural and Extension Education and Resource Development. The questions asked were:

1. When you think of the U.S. food system, what comes to mind?
2. Is it important for your students to understand the food system? Why?
3. Where do your students get information about the food system?
4. What role do you see educators playing in

- educating students about food and the food system?
5. What do you teach about food and the food system right now?
 6. Are the suggestions made by the Roundtable reasonable? Why/why not?
 7. What would be needed for teachers in grades 2-8 to teach in a manner suggested by the Roundtable participants?

Analysis of data followed the procedures set forth by Krueger (1994) and involved three phases. First, researchers discussed each interview immediately after the participants departed to underscore the salient observations that surfaced. This debriefing provided an opportunity for the impressions of each researcher to be heard.

In the second phase, raw data from interview transcripts were individually analyzed by two researchers. Discourse analysis was used (Tannen, 1989) to interpret the meaning of participants' comments as they answered interview questions. Strips of conversation from the raw interview data were axially coded to allow for reassembly into the essence of shared meaning (Strauss, 1987). This initial coding was shared between researchers to ensure inter-rater reliability. Changes or additions to coding schemes resulted from this cross-checking. The "bins" approach was used to organize data (Miles and Huberman, 1984).

The final phase of analysis sought confirming and disconfirming patterns of evidence among individuals. This was accomplished by two procedures. In one procedure researchers evaluated the extensiveness and frequency of the participant responses. Participants used many words (extensive discourse) when they had great understanding of, were experienced with, or were excited about a given topic. Frequent responses across the three groups were taken to be most commonly held by participants. In the second procedure researchers analyzed the data based on

what was missing from responses. Certain topics of conversation only infrequently or never surfaced.

Findings

Objective 1: Perceptions of the U. S. Food System

Teachers initially associated the U.S. food system with the government inspection of food and with regulations that govern food safety. Closely related were recent news items that questioned America's food safety such as "mad cow" disease, the Oprah Winfrey beef disparagement trial, meatpacking stories on 60 Minutes, and contaminated strawberries from Mexico arriving in Michigan schools. Similarly, several expressed concern about whether modern farming practices, such as chemical use and antibiotics being fed to livestock, were related to the earlier onset of puberty among their students or the increased incidence of cancer.

Nutrition was a secondary theme among teachers in describing the food system. The food pyramid and daily nutritional requirements were frequently mentioned. Teachers in all groups were quick to introduce fast food into their discussions and typically bemoaned the challenge between choosing taste and convenience over eating nutritious food.

Although each group cursorily mentioned the system of production, processing, packaging, marketing, and transporting of food products, discussion did not generally dwell on this topic. Also, little time was spent discussing farms and farming.

Objective 2: Importance of understanding the food system

Teachers' responses dealt primarily with food education and not agri-food system education. All of the three focus groups were

concerned that children do not eat balanced meals and do not associate items in their diet--such as fruit--with being essential for good nutrition. Students, the teachers said, also fail to link good diets with general health and well-being. Teachers believed that food is seen by youth as entertainment rather than as a source of nutrition. Advertisers reinforce this image by marketing food products as being “fun” and “in” over being healthy. As a result, the educators wanted to teach their students how to make better choices about their food, including how to read nutrition labels.

Teachers perceived that students do not understand where their food comes from and do not care how it arrives at their table. Specifically, they stated that youth tend to not understand what food animals are or know the products derived from them. Likewise, students are frequently unable to identify a carrot as a vegetable or that poultry is another term for chicken.

Connections to the food system, however, do occur in a limited fashion in some aspects of the curriculum. Some teachers--in history, economics, or social studies--taught the role of agriculture in society. A few teachers mentioned that they had taken classes on field trips to farms, or to processing enterprises. Only one teacher was concerned about the loss of farmland due to urban sprawl and its affects on Michigan’s agri-food system.

Objective 3 : Sources of food system information

Teachers identified the media--and specifically television--as being the primary source of information about the food system. They thought that television sends mixed messages about food. On one hand, the nightly news reports food scares and negative stories about food, but at the same time, advertisers capture the youths’ attention and shape attitudes about “in” foods. As a result, teachers see a disproportionate amount of

media exposure to “junk” and snack foods. Several of the groups mentioned the success of the pork, beef, and milk campaigns and how they have created positive images for their products -- campaigns that some would like to see duplicated for fruits and vegetables.

Teachers indicated that families are another source of information about food, but not a very knowledgeable one. It is well-known that children follow what’s modeled at home. For food system education, that may be troubling. Not only do few of today’s parents have any ties to food production, but because they were the first generation to be totally raised on television, they, too, rely on it for their food information. From their own personal experience, educators acknowledged that convenience takes precedence over nutrition in many families.

Teachers believed that the schools play an important role in food system education and, as one teacher noted, “children won’t get information about how a cracker is made and gets to their table unless it comes from schools.” These educators mentioned that they use the Michigan Health Model Curriculum for much of their teaching about food. Nutrition and label reading are two topics that regularly came up in all three focus groups and are activities in the Health Model.

Teachers raised the concern that the school system sends mixed messages. Although classrooms emphasize nutrition and a concern for the environment, many school’s serve and sell “junk” food in non-biodegradable packaging. By having a la carte menus, schools permit students to eat only what they like, thereby precluding a balanced meal.

Objective 4. Role of formal education in the food system

Teachers believed their primary role was to educate students about healthy nutritional choices.

They stressed the importance of teaching the food pyramid, food label interpretation, the digestive system, and food safety in the health curriculum. The ultimate goal of this focus was to help students become informed consumers. However, they expressed concern that families greatly influence eating behaviors and food choices. They felt it important to educate parents and adults about proper eating, while also focusing on the education of children.

Regarding their role in teaching the food system, only a few teachers, primarily based on their personal beliefs, stressed the need to help students understand the connections between people, soil, and food. They think students do not comprehend the various parts of the system (production, distribution, preservation) and believe this knowledge is important for students to understand connections between humans and the environment. Teachers observed a lack of curriculum material to teach students about the connections within the agri-food system.

Objective 5: Agri-food system content in schools

Teachers suggested that direct instruction about the agri-food system now begins early in school curriculums, but tapers off in middle school. They stated that in early elementary school, teachers used farm animals to teach such concepts as the relationship between parent and young, or humans' reliance on animals. However, after this, little in the way of formalized instruction was presented in a coordinated fashion. Teachers believed that the majority of knowledge and understanding after the early elementary years came from sources outside of school, e.g., media, peers, family, and personal experience.

Upper elementary teachers stressed that topics related to the agri-food system did surface at times in science and social studies. Specifically, they suggested that topics of current interest were discussed as they took the spotlight. For example,

they discussed weather and geography as it related to El Nino, water quality, and deforestation. In addition, teachers said that agriculture was touched on as students explored cultures of the past and the current economic system in social studies. In science, teachers stated that a newly developed curriculum from the Michigan Department of Education provided potential assistance in teaching about the connections between people and plants, but few actually used these products. They also stressed that most science teaching was directly related to the Michigan Educational Assessment Program (MEAP), the state's standardized testing conducted in fifth and eighth grades.

Teachers stated that they teach about issues related to agriculture, such as wetland preservation, deforestation, geographic regions, packaging, weather, etc., but present the topics in a manner devoid of agri-food system content. Those teachers stating that they now make these connections, seemed, by their discourse, to be more comfortable with the interconnectedness of these concepts, whereas those with little background spoke only oftouching on these topics as a result of their textbooks. Younger/newer teachers stressed they were very selective about what they taught their students; they felt great pressure to teach the content that was expected by their administration. Several believed that teaching about the food system would take time away from what was required to be taught.

Objective 6. Feasibility of MIFFS Roundtable suggestions

Teachers believed that MIFFS Roundtable suggestions were, for the most part, reasonable if sufficiently supported. They suggested the need to establish a system to strongly undergird an agri-food system education program in Michigan. They felt the hands-on/experiential learning recommendation was not practical considering the current level of financial support for schools.

Other limitations cited were: gardening being limited by cold weather, lack of greenhouses, and limited travel funds. Teachers believed experiential learning had merit; it was simply impractical.

Objective 7: Teacher needs to implement suggestions

Teachers believed that a thematically-based, integrated curriculum would be an effective method to get more food and agri-food system education into the schools. They cautioned, however, that this type of curriculum development requires time to create, expertise that only a few teachers currently possess, and an ability to see the interconnectedness of differing systems. To infuse such concepts and examples into the curriculum, teachers stated they needed guidance and support from outside their ranks. They suggested that grade-specific curricular models with supporting manipulatives be developed to meet Michigan's Model Core Standards and Benchmarks, the basis for the Michigan Educational Assessment Program (MEAP). They specifically suggested that an agri-food system education program should seek to emulate the products and processes of the Michigan Health Model program.

Most teachers stated they were not very comfortable with agricultural concepts and the agri-food system and suggested that support be provided in the following ways: 1) background materials for in-depth study about the topics, 2) a single source for consumable educational materials and a process for refurbishment, 3) education/training about the concepts covered in the grade-specific curriculum, 4) a resource expert via e-mail and the telephone, 5) a World Wide Web site specifically related to agri-food system education, 6) a video library of materials related to food system experiences, 7) lists of tradebooks related to agri-food system education, 8) lists of expert guest speakers willing to discuss agri-food system topics, 9) lists of sites for field

trips, 10) financial assistance to pay the high cost of bus travel, 11) ideas for bringing hands-on agri-food system relevance to urban students, 12) a mini-grant program to foster creativity in curricula, and 13) the establishment of a network of others interested in food systems education.

Conclusions/Discussion

1. Teachers saw the agri-food system from a nutritional and health perspective. Few teachers had any direct connections to production agriculture and neither did their students.
2. Participants believed it important for youth to understand where food comes from. Several linked understanding of food and food production to the development student respect for the environment.
3. Nutrition education dominates agri-food system education in most pre-secondary schools.
4. In upper elementary and middle schools, agri-food system topics are primarily addressed through classroom discussions of current events. Often times, media select highly charged and sensational issues for coverage, which may result in one-sided portrayal.
5. Families play an important role in developing an understanding of the agri-food system. However, teachers believe today's parents lack a thorough conception of the system, particularly with regard to healthy food choices.
6. Teachers praised the Michigan Health Model Curriculum, which has extensive materials for teaching food and nutrition concepts. However, they reported that links to production agriculture and biological and environmental impacts are missing from this

curriculum.

7. Teachers thought recommendations from the MIFFS Roundtable were reasonable, except for the focus on experiential learning. From their perspective, experiential learning is too costly, time consuming, and limited by school environmental factors and weather.
8. Teachers lauded a grade-specific, statewide, agri-food system curriculum. They expressed the need for an external entity to provide materials, develop supplemental curriculum materials, and support implementation of the curriculum. Teachers wanted a centralized resource center that provides support in this area. This parallels the National Research Council's (1988) recommendations that land grant universities establish centers to foster agriculture literacy.

Recommendations/Implications

The following recommendations and implications--based on teacher suggestions and needs--are offered to develop products and services to promote Michigan agri-food system literacy. Although contexts will differ from state to state, the recommendations and implications from this study may be illustrative for others concerned with promoting agri-food system literacy.

1. Develop supplemental agri-food system curriculum materials--aligned with Michigan Department of Education's Curriculum Standards and Benchmarks--to promote teacher comfort and understanding about a topic that is foreign to most. This has been pointed out previously by Humphrey, Stewart, and Linhardt (1994) who found preservice and inservice teachers in Missouri, possessed low levels of agricultural knowledge. This is particularly salient in light of Hashew's (1986) finding that prior teacher knowledge of subject

matter contributed to the transformation of written curriculum into classroom use.

2. Develop agri-food system educational materials linked to the Michigan Health Model Curriculum that relate to sustainability issues, food's link to production agriculture and the system's connection to biological principles and environmental impacts. This is supported by nutrition educators Gussow and Clancy (1986) who argue that "educated consumers need to make food choices that not only enhance their own health but also contribute to the protection of our natural resources" (p. 1).
3. Design educational products and programs focusing on careers within the agri-food system. These products and programs could provide a non-traditional context in which to explore the system by highlighting career responsibilities and activities. Linkages could be made to Michigan's Tech-Prep and School-to-Work programming efforts.
4. Foster creative alliances among agri-food system stakeholders to fund grants promoting experiential learning demonstration programs at the K-12 and university levels.
5. Strengthen and expand agri-food system teacher preparation programming, inservice educational programs, curriculum development activities, and the development of instructional materials and media.
6. Explore the creation of a public/private agri-food system education resource center to benefit both Michigan's school children and agri-food system education stakeholders.

References

- Balschweid, M., Thompson, G., & Cole, R. (1998). The effects of an agricultural literacy treatment on participating K- 12 teachers and their

curricula. Journal of Agricultural Education 39, 2, 1-10.

Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention and behavior. Reading, MA: Addison-Wesley Publishing.

Frick, M., Birkenholz, R. Gardner, H. & Machtmes, K. (1995). Rural and urban adult knowledge and perception of agriculture. Journal of Agricultural Education, 36, 2, 44-53.

Gussow, J & Clancy, K. (1986). Dietary guidelines for sustainability. Journal of Nutrition Education 18,1, 1-5.

Greenwald, A. G. (1989). Attitude structure and function. Hillsdale, NJ: Erlbaum Associates.

Hashew, M. Z. (1986). Effects of subject matter knowledge in the teaching of biology and physics. Paper presented at the Annual Meeting of American Educational Research Association, San Francisco, CA. (Eric Document Reproduction Service No. 275502)

Humphrey, J., Stewart, B., & Linhardt, R. (1994). Preservice elementary education majors' knowledge of and perceptions toward agriculture. Journal of Agricultural Education 35, 2, 27-30.

Krueger, R. (1994). Focus groups: A practical guide for applied research. Sage Publications: Thousand Oaks, CA.

Leising, J. & Zilbert, E. (1994). Validation of the California agriculture literacy framework. Proceedings of the Twenty-First National Agricultural Education Research Meeting, 112-119.

Marris, P. (1974). Loss and change. New York. Pantheon Books.

Merton, R., Fiske, M. and Kendall, P. (1990). The focused interview. Glencoe, IL: The Free Press.

Miles, M. & Huberman, A. (1984). Qualitative data analysis: A sourcebook of new methods. Beverly Hills, CA: Sage.

National Research Council. (1988). Understand agriculture: New directions for education. Washington, D.C.: National Academy Press.

Strauss, A. (1987). Qualitative analysis for social scientists. Cambridge: Cambridge University Press.

Tannen, D. (1989). Talking voices: Repetition, dialogue, and imagery in conversational discourse. Cambridge: Cambridge University Press.

Thompson, P. (1995). The spirit of the soil: Agriculture and environmental ethics. London: Routledge.

U.S. Department of Education. (1994). Issues of curriculum reform in science, mathematics and higher order thinking across the disciplines. Washington, D.C. : U. S. Government Printing Office.

Vahoviak, G. & Etling, A. (1994). Agricultural education and environmental education: Collaboration for global sustainability. The Agricultural Education Magazine 67, 5 : 13-16.

Wilkins, L. (1995). Seasonal and local diets: Consumers' role in achieving a sustainable food system. In Research in rural sociology and development: Sustaining agriculture and rural communities Vol. 6 Greenwich, CT: AI Press, Inc.