

Developing a National Framework for a Middle School Agricultural Education Curriculum

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In 1985 over 22 percent of all secondary agricultural education instructors taught one or more junior high/middle school courses in agriculture (Phipps & Osborne, 1988). This effort has occurred and will continue in middle grade agricultural education programs in an effort to provide early exposure to the world of agriculture and to increase self understanding in the preparation for careers. It is predicted that students enrolled in middle grade education in the United States will grow from 17.3 million in 1990 to 20 million by the year 2000 (Exter, 1992). Middle grade schools will increase to 20,000 by the year 2000 (George, 1988). Concurrent growth in middle school agricultural education can be expected.

Developing a framework for a middle school agricultural education curriculum is the first step in furthering the continuity and focus of middle school agricultural education programs. A study that examined the nationwide enrollment of middle school enrollment in agricultural education (Rosetti, Padilla, & McCaslin, 1992) recommended that the National FFA Organization, the U.S. Department of Education, and the U.S. Department of Agriculture encourage the development of a middle and/or junior high school agricultural education core curriculum. The study also recommended that the designers of middle school programs ensure that middle school programs are distinct from senior high school programs.

The Task Force on Middle School Agricultural Education suggested that, because of the nature and maturity level of the middle school student, the core curriculum follow two themes: 1) agricultural literacy and 2) exploration of agricultural topics. Waidlech (1992) stated, "Curriculum designers and instructors need to build courses that incorporate agricultural literacy with personal development and interdisciplinary connections in a one-semester or shorter program." Career exploration and applied science were two agricultural curriculum areas recommended for the middle school in The National Academy of Sciences report, Understanding Agriculture: New Directions for Education (National Research Council, 1988). The need for agricultural literacy initiatives has been made evident by demographic changes in our society. In 1985, 90 percent of the United States population had been nonfarm for over 30 years (Douglass).

In order to facilitate systematic instruction, increased continuity, and the development of instructional materials and media, the core curriculum for middle school program that focuses on agricultural literacy and exploration needs to be determined. The identification of subject areas and topics for a middle school agricultural literacy and exploration core curriculum would further unify middle school agricultural educators in their efforts. This study used the Delphi technique to develop the framework for a middle school agricultural education curriculum. Finch and Crunkilton noted that (1989, p. 154) "Obviously, this technique would be of much value when persons desire to reach consensus regarding the content of a particular curriculum."

Purpose and Objectives

The fundamental purpose of this study was to develop a document that could provide agricultural educators with the subjects and topics that constitute the core curriculum for a middle school agricultural education program.

The specific objectives of this study were to:

Determine the agricultural literacy subject areas and topics which constitute the framework of a middle school agricultural education core curriculum.

Determine appropriate exploratory subject areas and topics of agriculture which constitute the framework of a middle school agricultural education core curriculum.

Procedures

This investigation was conducted in three parts, each moving closer to satisfying the objectives. Delphi was the research procedure most congruent with purpose and objectives of the study (Dalkey, 1969; Helmer, 1967; Linstone and Turoff, 1975). The Delphi technique is a method of eliciting and refining group opinions. According to Helmer (1966), variants of the Delphi can be applied to all phases of educational planning, including curriculum reform.

Pre-data collection

After reviewing the literature and related research, a letter requesting a minimum of two nominees to the Delphi panel was sent to presidents of NVATA State Associations in all 50 states. The letter asked that nominees possess an interest in middle school agricultural education; have the time, in the nominator's estimation, to devote to the study; and be a middle school agricultural education teacher. Of the 50 panelists nominated from 26 states, 34 initially agreed to participate in the study. From the initial 50 panelists, 21 participated in all phases of the study. The process was iterative. The 21 panelists were geographically located in 19 different states. Of the 21 panelists, eight were from the central region, seven were from the eastern region, four were from the western region, and two were from the southern region. Alkey (1969), in extensive studies of the Delphi Technique, found reliability to be a function of group size. According to Dalkey, when the number of participants per group was greater than 13, question of process reliability were satisfactorily answered; mean correlations were greater than .80. The number of panelists involved in all phases of this study surpassed the number needed to satisfactorily answer the question of process reliability.

Preliminary questions were determined through formalized discussions with members of the middle school task force on agricultural education. Questions asked of panelists were developed and validated through an internal panel of experts. The basis for questions related to the agricultural literacy subject areas and topics appropriate for a middle school agricultural education core curriculum were derived from a national study (Frick, Kahler, & Miller, 1990) that identified the subject areas of agricultural literacy for the general

public. According to Frick, Kahler, and Miller, (1990) "Agricultural literacy is understanding and possessing knowledge of our food and fiber system. An individual possessing such knowledge would be able to synthesize, analyze, and communicate basic information about agriculture." The secondary objective of the study was initially addressed by asking panelists to submit the exploratory subjects they thought were appropriate for a middle school agricultural education core curriculum. Subsequent questionnaires were administered to panelists to refine agricultural literacy and exploratory subject areas and topics that would constitute a middle school agricultural education curriculum.

Rating of Subject Areas and Topics

Subject areas and topics offered and generated were collected through the objective-driven Delphi instruments. Individually prepared follow-up letters were sent to encourage participation. The researcher eliminated duplicate subject areas and topics to refine the lists generated by Delphi panelists. Panelists were asked to respond using a seven-point Likert-type scale to describe their value regarding the importance of a subject area and topics for a middle school agricultural education core curriculum. A rating of seven on the Likert scale represented a teacher's opinion of 'most important' regarding subject and/or topic importance, whereas a rating of one represented a teacher's opinion of 'least important'. Summary statistics were then calculated for each set of data in the study.

Analysis of Data

Due to the nature of the chosen research procedures, the treatment of data involved the use of frequencies and percentages. Frequency distributions were used to distill and refine the subject areas and topics submitted for agricultural literacy and exploratory themes in a middle school agricultural education core curriculum. Those subject areas and topics where 50 percent or more of the panelists chose to rate the subject area or topic as 'important' (rating of 6) or 'most important' (rating of 7) represented consensus and were included in the final lists of subject areas and topics that constituted a core curriculum for middle school agricultural education. After an interaction, each panelist received his/her initial rating and the combined percentage of panelists' rating each item 'important' (6) or 'most important' (7). The panelists were instructed to re-evaluate the statements in light of the additional information provided through the summary statistics. Findings were used to develop a consensus document that can provide the direction and continuity needed in a national core curriculum for middle school agricultural education.

Results

Agricultural Literacy Subject Areas and Topics for Middle School Agricultural Education

Table 1 presents the four agricultural literacy subject areas that were retained if 50 percent or more of the panelists rated the subject an 'important' (rating of 6) or a 'most important' (rating of 7). The Delphi process and analysis reduced the list from eleven subject areas to the four remaining. Topics that were grouped under the four agricultural literacy subject areas were rated by panelists. Table 2 presents the agricultural literacy topics that were retained if 50 percent or more of the panelists rated the topic an 'important' (rating of 6) or a 'most important' (rating of 7). The Delphi process and

analysis of data reduced the list of topics from 23 to the 17 remaining for the four agricultural literacy subject areas. The remaining middle school agricultural literacy subject areas and topics represent consensus among panelists on an agricultural literacy core curriculum for middle school agricultural education.

Table 1. Agricultural Literacy Subject Areas Refined by Middle School Delphi Panelists

Subject area	Percent of panelists indicating a 7 or 6 on a Likert scale of 7 (most important) to 1 (least important)
Agriculture's important relationship with the environment	78.6
Agriculture's important relationship with natural resources	64.3
Societal significance of agriculture	53.6
The global significance of agriculture	57.1

Table 2. Agricultural Literacy Topics by Subject Area Refined by Delphi Panelists

Subject area	Percent of panelists indicating a 7 or 6 on a Likert scale of 7 (most important to 1 least important)
Agriculture's Important Relationship with the Environment	
The agriculturalist's role in protecting the environment	75
The effect of agriculture on the environment	91.7
Opinions and perceptions	54.2
Chemicals positive effects of agriculture on the environment	83.4
Negative effects of agriculture on the environment	62.5
The environment's close relationship with agriculture	91.6
Agriculture's Important Relationship with Natural Resources	
Conservation of natural resources sustainable agriculture	87.5
Stewardship of agriculture	66.7
Pollution and depletion of our natural resources	62.5%
Codependent relationship between agriculture and natural resources	83.4
Importance for agriculture	83.4
Societal Significance of Agriculture	
Society's lack of awareness	79.2
Agriculture's effect on society	87.5
Food efficiency	66.5
The Global Significance of Agriculture	
Global food economics	70.8
Global hunger and food distribution	70.8

Exploratory Subject Areas and Topics for a Middle School Agricultural Education Curriculum

Table 3 presents the six middle school agricultural exploratory subject areas that were retained if 50 or more of the panelists rated the subject an 'important' (rating of 6) or a

'most important' (rating of 7). The Delphi process and analysis reduced the list from the 22 panel-generated subject areas to the six remaining. Topics that grouped under the 6 agricultural exploratory subject areas were rated by panelists. Table 4 presents the agricultural exploratory topics that were retained if 50 percent or more of the panelists rated the topic an 'important' (rating of 6) or a 'most important' (rating of 7). The Delphi process and analysis of data reduced the list of topics from 90 to the 42 remaining for the six subject areas. The remaining middle school agricultural exploratory subject areas and topics represented consensus among panelists on an agricultural exploratory core curriculum for middle school agricultural education. The 22 subject areas and 90 topics provide some indication about the broad expanse of agricultural education content at the middle school levels.

Table 3. Refined List of Subject Areas Generated by Middle School Delphi Panelists

Subject area	Percent of panelists indicating a 7 or 6 on a Likert scale of 7 (most important) to 1 (least important)
Food safety/consumer relations	57.7
Leadership/human relations	57.7
Careers and future of agriculture	88.5
Agricultural science and experimentation	57.7
Agricultural vocabulary	57.7
Agricultural benefits to world	73.1

Table 4. Middle School Topics by Subject Area as Refined by Panelists

Subject area	Percent of panelists indicating a 7 or 6 on a Likert scale of 7 (most important) to 1 (least important)
Food Safety and Consumer Relations	
What is on a food label?	52.4
Discussion of food-from production to consumption	80.9
Safe use of chemicals in food production	66.7
Dissolving myths of chemical residues	66.7
The role of food inspection and grading in assuring a safe food supply	52.4
Leadership and Human Relations	
Importance of values	61.9
Opportunities of leadership positions in agriculture	76.2
Need for cooperation and idea sharing in research and business	52.4
Public speaking	66.7
Communication of the importance of agriculture through the types of media	66.7
How important leadership is to ourselves and others around us	80.9
Leadership and the FFA	66.7
Basic conduct of meetings	52.4
FFA leadership and parliamentary procedure	52.4

Table 4 continued.

Subject area	Percent of panelists indicating a 7 or 6 on a Likert scale of 7 (most important) to (least important)
The effects of leadership skills on future career opportunities	81.0
Careers and Future of Agriculture	
What the FFA can do for you!	52.4
Requirements of job entry	52.4
Agriculture's future and how can I prepare for an agricultural career?	76.2
Occupational opportunities for agriscience in the 21st century	80.9
Agricultural career areas and related high school and college courses	61.9
Diversity of agricultural careers	76.2
Agricultural careers can meet your interests	85.7
On-farm and off-farm careers	52.4
Career opportunities in animal science, plant science, etc.	57.1
The impact of biotechnology on agriculture careers	76.2
Agricultural Science and Experimentation	
Relate to food science, agricultural chemicals, and agricultural products	52.4
Student experiments on IPM, food science, and plant physiology	80.9
Plant germination and growth	71.4
Daily benefits of agriculture research	57.2
Agricultural Vocabulary	
Crossword puzzle of common terms	57.1
Agriculture terms (general, crops, livestock, soils etc.)	57.1
Agriculture literacy "We all should know"	90.5
Basic literacy of misunderstood agriculturally related terms	52.4
What terms should students know in agriscience?	52.4
Terms found in teaching plant, animal science and agribusiness	52.4
Agricultural Benefits to the world	
What benefits can/do I receive from agriculture?	80.9
Agriculture: "It keeps you and me on top of the world."	52.4
New discoveries that are used in human medicine	57.1
Show diversity of finished products from plants and animals	61.9
Dependency of world on agricultural production and processing	57.1
Describe how important agriculture is to your area and the world	61.9
Effect of the world's people without farmers or agricultural workers?	61.9

Conclusions and Recommendations

The following conclusions were drawn from the results of the study.

A core curriculum for middle school agricultural education encompasses four agricultural literacy subject areas and six exploratory subjects.

The 17 agricultural literacy topics and 43 agricultural exploratory topics that grouped under their respective subject areas provide further structure for curriculum development. The topics can be used to develop modules about specific agricultural topics that are appropriate for the middle school grade levels.

The subject areas and topics identified through this study provide the direction and continuity needed to develop a nationwide set of instructional materials for use in middle school agricultural education programs.

The following recommendations were derived from the conclusions:

Instructional materials should be developed with the middle school student in mind. The student's interests, concerns and maturity level should be highly considered in the final development of materials.

A study that would determine middle school students' interest in the subject areas and topics presented is highly recommended.

As more middle school programs are started, a document that illustrates various effective teaching strategies for the middle school agricultural education instructional materials should be developed and distributed to teachers.

State education agencies and teacher education programs should design inservice and preservice programs to prepare current and prospective teachers for teaching middle school agricultural education program content.

Designers of middle school agricultural education programs should ensure that program content is distinct from senior high school programs.

The identification of where the subject areas and topics can be integrated in the total middle school curriculum is highly recommended.

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