

# Identifying Innovative Agricultural Education Programs

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## ABSTRACT

*Researchers identified innovative agricultural education programs across the United States. A Delphi study was conducted with the teachers in innovative programs. According to the teachers, innovative programs in 2020 will use hands-on activities and will be run by highly motivated teachers. The purpose of innovative programs in the future will be to utilize the current professional community to teach skills needed in a changing industry and to encourage students to “think outside the box” and challenge themselves. Innovative programs will be hands-on, include problem solving, and critical thinking. The people involved in innovative agricultural education programs in the future are students, innovative agricultural education teachers, school administrators, and professionals in the community with particular skills sets needed in agricultural education. Teachers of selected innovative agricultural education programs did not agree that innovative agricultural education programs should have a global reach or that every student should have a Supervised Agricultural Experience.*

## Introduction/Conceptual Framework

According to the National Research Agenda for Agricultural Education (Doerfert, 2011), research priority five builds the case for efficient and effective agricultural education programs. Priority five goes on to state our scientific focus should, “Define characteristics of effective agricultural education programs and teachers and the means to correctly access the current state of these characteristics” (p.10). One approach to achieving this goal is to identify and replicate sustainable innovative program designs.

An innovative program is defined as a program that is new and creative, especially in the way that something is done. Rogers (2003) defined innovations as ideas, practices, or objects that are perceived as new by an individual or other unit of adoption. According to *Reinventing Agricultural Education for the Year 2020*, “agricultural education envisions a world where all people value and understand the vital role of agriculture, food, fiber, and natural resources industries in advancing personal and global well-being” (NCAE, 1999, p. 2). Is it possible that innovative programs are overlooked because they are not perceived as new? Many programs are defined by quality indicators such as success in career development events or national chapter awards, but little attention has been given to identifying or measuring the “innovativeness” of programs that are serving a totally different audience than traditional agricultural education programs serve.

With the help of key stakeholders from each state, this study identified and showcased programs that were not identified or rewarded through current awards and recognition systems.

The purpose of this study was to identify characteristics of programs that are innovative in their approach to classroom instruction, supervised agricultural experience, and FFA activities and to showcase these programs to a broader audience with the hope that they will be replicated. Rogers (2003) states that implementation of an innovation in an organization amounts to a mutual adaptation of the innovation and the organization. This mutual adaptation occurs because the innovation almost never fits perfectly in the organization. Roger's theory may help explain why truly innovative programs are often overlooked or not recognized by our current awards and recognition system.

Upon the arrival of the 21<sup>st</sup> Century, the need for career and technical education (CTE) reformation was evident in order to prepare students for employment and higher education (Lynch, 2000). As a new world of fast communications and information requiring rapid decision-making and intelligent social skills (Nijhof, 1998), students in today's society must develop a variety of skills beyond the narrow job tasks focused on in historical CTE programs. In contrast to Prosser's essentialism, Lynch (2000) stated that, "It isn't just 'training' for specific jobs that is needed [by 21<sup>st</sup> Century students], but to make decisions, solve problems, find answers, and draw on a variety of disciplines and cultural contexts to make sense out of changes, challenges, and day-to-day operations at the workplace" (p. 9). Innovative and exemplary CTE programs are needed to accomplish this feat. A list of common characteristics of "outstanding," or exemplary, programs was compiled from several reports evaluating effective schools including: (a) high academic standards; (b) integrated rigorous academic content with real-world applications; (c) authentic student assessment; (d) adequate resources to ensure student success; (e) school-supervised service- and work-based learning opportunities; (f) highly qualified teachers; (g) partnerships with the community and stakeholders; and, (h) a school-within-a-school environment often achieved with a team approach through an integrated professional, career, or applied major (Lynch, 2000). The reformation of innovative CTE programs has occurred through the infusion of career planning throughout the entire curriculum related to real-world environments, improved curriculum delivery and organization, increasing academic quality, substantive image upgrading, and by preparing graduates for both the workplace and continued education (Lynch, 2000).

Using innovative/exemplary programs as a model for other programs to follow is not a new concept. Budke and Bragg (2000) identified exemplary programs throughout the following secondary CTE career clusters: culinary arts and hospitality services, digital design, tech prep electronics technology, welding technology fabrication, computer graphics design, computer network administrator, culinary academy, and early childhood education. While specialized programs do exist in agricultural education, few are rarely noted as exemplary or innovative. This study captured some of the essential components of innovative programs in agricultural education to be mirrored by teacher educators, state agricultural education staff, agricultural education teachers in the field, and relevant stakeholders in the future.

## **Purpose and Objectives**

The purpose of this study was to identify innovative program designs in agricultural education across the United States. Specific research objectives were to:

- 1) Describe what an innovative agricultural education program will look like in 2020.
- 2) Describe the purpose, mission, and objectives of an innovative agricultural education program in the future.
- 3) Describe the components/characteristics of an innovative agricultural education program in 2020.
- 4) Describe the people involved in innovative agricultural education programs in the future.

## **Methodology**

### ***Identification of Innovative Programs***

The population for this study consisted of agricultural education programs from across the nation whose programs were identified innovative in their makeup. A wide variety of stakeholders (State Agricultural Education Supervisors, Teacher Educators, State Agricultural Teachers Association Leaders, CTE Directors in major metropolitan areas, National FFA Local Program Success Specialists and Agricultural Education Materials/Specialized Equipment Dealers) in agricultural education were contacted to identify innovative agricultural education programs. By involving a wide variety of subjects in this mode of data collection, the researchers believed these professionals had a sense of truly innovative programs. The programs exhibited many characteristics that are found in typical agricultural education settings. One consideration the researchers had in determining the innovativeness of the program was the idea of whether a program was innovative from a local, regional, or national standpoint. For example, aquaculture may not be perceived as innovative in Mississippi; however, it could be in Montana.

A total of 142 agricultural education programs were nominated by the stakeholders. The researchers sought consent of teachers and administrators in these programs to participate in a study of their practices and procedures – their innovative techniques. The teachers were initially contacted via email and follow up phone calls were then made to seek consent. Thirty-five programs agreed to document their innovative program activities. The researchers evaluated responses from the 35 programs and operationally defined an innovative program as being one that: 1) Used innovative technology, 2) had a creative context for teaching agricultural education, 3) delivered content to new/unique audiences, 4) had a unique setting for delivering their agricultural education program or 5) had a highly specialized training program (e.g., certified vet-tech, certified welders, meat processing facility). A total of 15 programs were selected based on the criteria for innovative agricultural education programs. These programs represented four of the six regions established by the National Association of Agricultural Educators (NAAE) and three of the four regions recognized by the National FFA Organization.

### ***Delphi Study***

The Delphi technique was used to solicit responses from the teachers at the 15 participating programs. The Delphi technique is a group process designed to solicit expert responses toward reaching consensus on a particular problem, topic, or issue (Delp, Thesen, Motiwalla, & Seshadri, 1977). The teachers at each of these programs were experts in terms of programmatic knowledge related to their own agricultural education program, thus they were the

panel of experts in this study. According to Linstone and Turoff (1975), the Delphi technique is designed to "...structure a group communication process in order to obtain a useful result..." (p. 5). The study used a series of three electronic questionnaires. In the first round of the study, the participants were asked four open-ended questions: 1) What would an innovative agricultural education program look like in the year 2020? 2) What would be the purpose, mission, objectives, goals or vision of an innovative agricultural education program in the future? 3) What should be the components/characteristics of an innovative agricultural education program in the year 2020? 4) Describe all the people you think will be involved in innovative agricultural education programs in the future. According to Dyer and Breja (2003), open-ended questions are "...used to facilitate the generation of a wide array of response categories" (p. 77). Multiple contacts were made throughout the first round and 12 participants submitted their responses.

In the second round of the Delphi study, responses from the first round were compiled and participants were asked to rate their level of agreement for each statement on a five-point scale (1 = Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree). The second round consisted of 48 statements and the teachers were contacted six times during the second round. The researchers set *a priori* a mean score of  $M = 4.0$  as the level of consensus for round two and three.

Following the second round of the Delphi study, the data was compiled, mean scores were obtained, and all statements that failed to reach 80% consensus were further analyzed. In the third round of the Delphi study, all responses from the second round were put into a scale for the participants to rate the level of agreement for each statement.

## **Results/Findings**

### ***Round One***

Round one of the Delphi study elicited 48 statements in response to the open-ended questions. The response rate for round one was 80%, ( $N = 12$ ). The researchers chose to report categories with single responses for all four questions, to ensure breadth of data. Fifteen categories were identified for question one: What would an innovative agricultural education program look like in the year 2020? The use of current technology and rigorous classroom/STEM integration were the two categories that were mentioned the most. The inclusion of all fields of agriculture, matching industry trends, community involvement, highly motivated teachers, and virtual classrooms/videoconferencing were also mentioned by more than one participant.

Twelve categories were identified in round one for question two: What would be the purpose/mission/objectives/goals/vision of an innovative agricultural education program in the future? Educating students and involving parents and the community in the process of educating students were listed by multiple participants.

Twenty-four categories were identified for question three: What should be the components/characteristics of an innovative agricultural education program in the year 2020? Use of current/new technology was mentioned by more than half of the participants. Hands-on

experiences and stakeholder involvement – community and industry partnerships were mentioned by three participants.

Fifteen categories were identified for question four: Describe all the people you think will be involved in innovative agricultural education programs in the future; consider those inside and outside the school. Half the participants mentioned industry representatives and the community as people that will be involved in programs of the future. School administration (board of education members, superintendents, and principals) was also identified as people who will be involved in programs of the future. Core-subject teachers, program graduates, and fellow agriculture teachers were also mentioned by more than one participant as people who would be involved in an innovative agricultural program of the future.

### ***Round Two and Three***

In round two of the Delphi study participants reported that innovative agricultural education programs in the year 2020 will be highly technological and current with agricultural industry trends encompassing all aspects of the agricultural industry. Ten of the 15 participants responded in round two. The participants believed the purpose of innovative agricultural education programs will be to educate students and the community by matching industry trends and finding new ways to improve agriculture. Furthermore, innovative agricultural education programs will be focused on the students' futures and will strive to develop life-long learners who will be leaders in the agricultural industry and in the community.

To accomplish the outlined purpose/mission of agricultural education programs, programs will need to educate students about all facets of the agricultural sector, rely on community and industry partnerships, stay current with technological trends, teach students through the use of hands-on experiences and community projects, and be willing to adjust and change to meet the needs of agricultural industry. To accomplish the mission/goals of innovative agricultural education programs, many people will need to be involved. According to the participants the following people should be involved in agricultural education programs in the year 2020: core subject teachers, community members, agricultural industry representatives, school administrators, fellow agricultural educators, an advisory board, students, and parents.

Round two and round three data are displayed below. Table 1 shows the participants' level of agreement about what an agricultural education program will look like in the year 2020. There were 10 respondents for round three. All of the participants agreed that an innovative agricultural education program in the year 2020 will use hands-on activities ( $M = 5.0$ ), and many of the participants agreed that the programs will be run by highly motivated teachers ( $M = 4.9$ ). A majority of the teachers agreed that innovative programs will match industry trends ( $M = 4.7$ ). Most (six of 10) neither agreed nor disagreed or disagreed that an innovative program in the year 2020 will look much like programs do now ( $M = 3.0$ ).

Table 1

*What Will an Innovative Agricultural Education Program Look Like in 2020?*

Collapsed Responses	<i>f</i> Strongly Disagree/ Disagree	<i>f</i> Neither Agree nor Disagree	<i>f</i> Agree/ Strongly Agree	<i>M</i>
An innovative program will utilize hands-on activities.	0	0	10	5.0
Innovative programs will be run by highly motivated teachers.	0	0	10	4.9
An innovative program will match industry trends.	0	0	10	4.7
An innovative program will be made up of a diverse population.	0	1	9	4.7
An innovative program will implement a rigorous curriculum.	1	0	9	4.6
In an innovative program lessons will be geared toward current and future information, well rounded innovative agriculture science education.	0	0	10	4.5
An innovative program will utilize current technology.	0	1	9	4.5
An innovative classroom and teacher will have the latest and greatest tools available to their students.	0	3	7	4.5
Programs are not innovative because of the buildings that they reside in; they are innovative because of the people in the classrooms.	1	1	8	4.4
Innovative agricultural education programs will have forward/futuristic thinking teachers.	0	2	8	4.2
In an innovative program the historical background of the agricultural industry will be taught.	0	2	8	4.1
<b>Items that failed to reach consensus after three rounds</b>				
In an innovative program students will have access to on-line lectures.	0	3	7	3.8
An innovative ag ed program in the year 2020 will look much like it looks now.	4	2	4	3.0

*Note.* Scale: 1= Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree.

Table 2 displays the perceived purpose, mission, and objectives of an innovative agricultural education program in the future. The participants agreed that one purpose of an innovative program is to utilize the current professional community when teaching the skills

needed to succeed in the changing industry ( $M = 4.7$ ). Participants also agreed that programs are designed to encourage students to think outside the box and challenge themselves ( $M = 4.6$ ) and to develop life-long learners ( $M = 4.5$ ). Half of the respondents neither agreed nor disagreed or disagreed ( $M = 3.7$ ) that the purpose of an innovative agricultural education program was to prepare students careers and continued education in STEM. Six of 10 respondents neither agreed nor disagreed or disagreed ( $M = 3.4$ ) that the purpose of the program should not change much in the future.

Table 2  
*Purpose, Mission, and Objectives of an Innovative Agricultural Education Program in the Future*

Collapsed Responses	<i>f</i> Strongly Disagree/ Disagree	<i>f</i> Neither Agree nor Disagree	<i>f</i> Agree/ Strongly Agree	<i>M</i>
To utilize the current professional community when teaching the skills needed to succeed in the changing industry.	0	0	10	4.7
To encourage students to think outside the box and challenge themselves.	0	0	10	4.6
To develop life-long learners.	0	0	10	4.5
To allow students to work in the community and learn skills.	0	0	10	4.5
To develop leaders within their community and generation.	0	0	10	4.5
To provide fundamental knowledge and skills for agricultural careers.	0	0	10	4.5
To educate the community about agriculture.	0	1	9	4.5
Place an emphasis on critical thinking and problem solving.	0	1	9	4.5
To match industry trends and change curriculum to match the job markets.	0	1	9	4.4
To educate the students about agriculture and the skills they need to be successful in the future.	0	1	9	4.4
The purpose will always be changing according to the current trends in agriculture and should be updated every year.	0	2	8	4.4
To provide the up to date equipment/supplies and knowledge for the students to utilize.	0	1	9	4.3
To provide the needed stepping stones to work in the profession.	0	2	8	4.3
To teach students about the foundation and history of agricultural education.	0	2	8	4.1
<b>Items that failed to reach consensus after three rounds</b>				
To prepare students for careers and continued				

education in STEM.	1	4	5	3.7
The purpose of the program should not change much in the future.	3	3	4	3.4

*Note.* Scale: 1= Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree.

Table 3 displays the predicted components and/or characteristics that an innovative agricultural education program will possess in the year 2020. According to the participants programs in the year 2020 will contain hands on activities ( $M = 4.8$ ), promote problem solving ( $M = 4.8$ ) and encourage critical thinking ( $M = 4.8$ ). Half of the respondents stated that they neither agreed nor disagreed with the agricultural education program having a global reach ( $M = 3.8$ ) and the same percentage neither agreed nor disagreed that every student should be involved in a specific SAE ( $M = 3.7$ ).

Table 3

*Components/characteristics of an Innovative Agricultural Education Program in 2020*

Collapsed Responses	<i>f</i> Strongly Disagree/ Disagree	<i>f</i> Neither Agree nor Disagree	<i>f</i> Agree/ Strongly Agree	<i>M</i>
Hands-on activities	0	0	10	4.8
Problem solving	0	0	10	4.8
Critical thinking	0	0	10	4.8
Community/industry partnerships	0	0	10	4.7
A program should be flexible to adjust to the changes in the agricultural profession and community needs/demands	0	0	10	4.6
An innovative program will possess clear and concise plans for the future.	0	0	10	4.6
Adequate instructor preparation and training, not only for classroom and technology situations, but also for the variety of agricultural topics.	0	1	9	4.6
Adequate funding to afford the lab activities and equipment.	0	2	8	4.6
Community projects	0	0	10	4.5
New technology in agriculture	0	1	9	4.5
Ethics	0	1	9	4.5
Strong and positive ties with the community and business sector.	0	0	10	4.4
Lab space for research activities	0	1	9	4.3
A program should require the extra mile from the students.	0	1	9	4.3
Adequate facilities (new or renovated) to encompass modern agricultural and educational technologies, classroom and	0	1	9	4.3



laboratory.				
Biotechnology	0	2	8	4.3
College articulation	0	2	8	4.2
Access to the latest communication technology	0	2	8	4.2
Every student involved in an agricultural education course.	0	2	8	4.2
Educate the students about the history of agriculture and why they need it in the future	0	3	7	4.0
Easy access to meet the needs outside of the normal school day so that students can communicate and work with individuals outside the school around the world.	0	3	7	4.0
<b>Items that failed to reach consensus after three rounds</b>				
Adequate instructor experience with entrepreneur and placement time (several years).	0	4	6	3.9
Every student should be a productive FFA member.	1	2	7	3.9
The program would have a global reach.	0	5	5	3.8
Every student involved in a specific SAE.	0	5	5	3.7

*Note.* Scale: 1= Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree.

Table 4 displays a list of those people who will be involved with innovative agricultural education program in the year 2020. All the participants agreed that students ( $M = 4.8$ ), innovative agricultural education teachers ( $M = 4.7$ ) and school administrators (CTE director, principal) ( $M = 4.6$ ) are all important stakeholders for innovative agricultural education programs in 2020. The participants failed to reach consensus on: other people from around the world ( $M = 3.9$ ), social studies and math teachers ( $M = 3.7$ ), advisory board members outside the local area ( $M = 3.7$ ) and fine arts teachers ( $m = 3.4$ ).

Table 4

*The People Involved in Innovative Agricultural Education Programs in the Future*

Collapsed Responses	<i>f</i> Strongly Disagree/ Disagree	<i>f</i> Neither Agree nor Disagree	<i>f</i> Agree/ Strongly Agree	<i>M</i>
Students	0	0	10	4.8
Innovative agricultural education teachers	0	0	10	4.7
School administrators (Principal/CTE Director)	0	0	10	4.6
Professionals in the community who offer the skills needed for that particular area of study.	0	0	10	4.6

Parents	0	0	10	4.6
Community-based partnerships	0	0	10	4.6
Superintendents	0	1	9	4.6
FFA officers	0	1	9	4.6
Local agricultural businesses	0	0	10	4.5
Innovatively minded advisory board	0	0	10	4.5
FFA members	0	1	9	4.5
FFA Alumni	0	1	9	4.5
Board of education	0	2	8	4.4
Industry representatives	0	1	9	4.3
Science teachers	0	2	8	4.2
College staff	0	3	7	4.2
Inventors	0	4	6	4.0
English teachers	1	2	7	4.0
<b>Items that failed to reach consensus after three rounds</b>				
Other people from around the world	0	4	6	3.9
Social studies teachers	1	3	6	3.7
Math teachers	1	3	6	3.7
Advisory board members outside the local area, state, or in another country	2	2	6	3.7
Fine arts teachers	1	6	3	3.4

*Note.* Scale: 1= Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree.

## Conclusions/Implications

This study addressed research priority five of the National Research Agenda for Agricultural Education (Doerfert, 2011): Efficient and effective agricultural education programs, by identifying characteristics of innovative agricultural education programs that can serve as model programs for the agricultural education profession. Many of the agricultural educators in this study had similar views on innovative agricultural education programs in the year 2020, but only a few of the statements reached unanimity.

Participants viewed future innovative programs as hands-on programs that will match industry trends and will be led by highly motivated teachers. Innovative programs will involve a rigorous curriculum that will include lessons on cutting edge topics in agriculture such as biotechnology, in addition to teaching about agricultural history and ethics. According to the participants, innovative programs will be comprised of diverse populations and have the most up-to-date technology.

According to teachers in this study, the purpose of an innovative agricultural education program in the future will be to use the current professional community when teaching the skills needed to succeed in the changing agricultural industry. Innovative programs of the future will encourage students to think outside the box and challenge themselves to become life-long

learners through placing emphasis on developing problem solving and critical thinking skills. Programs of the future will match industry trends and continuously adjust their curricula to accommodate the changing agricultural industry. Innovative programs will strive to develop leaders within their community who possess fundamental knowledge and skills for future agricultural careers. In addition to educating students in formal classroom settings, innovative programs will educate the community about agriculture.

The components/characteristics of innovative agricultural education programs in 2020 will be diverse, according to the participants. The components/characteristics outlined by the participants support the purpose and missions previously stated by the participants. Innovative programs of the future will possess clear and concise plans for the future that will be developed with the assistance of important investors of both time and finances. Programs will need to remain flexible to adjust to changes in the agricultural industry and develop strong and positive ties to the community and business sectors. Adequate funding will be required for programs to become and remain innovative; and will need to continually participate in professional development activities to remain up to date on not only technology, but also trends in agriculture. Innovative programs will contain lab space for research activities and have availability to new technologies used in agricultural industry. Many of these characteristics are similar to Prosser and Allen's (1925) work in vocational education in the 1920's. Although there is nothing wrong with ties to our philosophical roots in agricultural or vocational education, the question arises, are we truly being innovative in terms of program design, delivery, or outcome?

The group of individuals who will play a key role in programs of the future is diverse and very similar to the individuals who are currently involved in successful programs. This group includes students and their parents, as well as school administrators. The group also consists of community members and local agricultural businesses. The participants mentioned other teachers, science and English, who would be involved as well. The individuals mentioned tie closely to the components/characteristics and to the purpose and missions outlined by the participants.

## **Recommendations**

Based on the finding of this study, there are many recommendations for practice and for further research. One of the only ways to replicate innovative program designs is to share what they look like to a broad audience. Teacher educators should seek out programs with these characteristics and use them as a model for program development. Agricultural education has always relied heavily on hands-on experiential learning as a method of instruction. Teachers in this study believe innovative programs will continue to use hands-on instruction, but the question arises, is this an innovative approach to teaching and learning for the future?

Further research is needed in many areas to identify innovative program designs. Case studies, focus groups, and interviews could provide rich description of programs and provide many details that were not captured in this study. It is important to note that many schools identified as innovative, chose not to participate in this study. Perhaps site visits to document innovative practices would yield more descriptive data.

The teacher is a variable that could be overlooked when determining the innovativeness of an agricultural education program. Future studies should focus on the impact of the teacher in regards to innovative programming. Teachers in this study reported that not all students needed to be in FFA and that not every student should have an SAE in innovative programs of the future. Do these teachers have a valid point? FFA and SAE are cornerstones of agricultural education. Is it time to revisit the three-circle model or to create a different model for innovative program designs? Time will tell!

Innovative programs are typically not the programs recognized by the current awards and recognition process used by state and National FFA. In order to increase the number of chapters across the country recognized as innovative, state FFA associations, as well as National FFA should explore ways to recognize the most innovative program designs and develop a platform to showcase these programs not only to the agricultural education community, but to the entire career and technical education profession.

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