PERCEPTIONS OF THE NATIONAL AGRISCIENCE TEACHER AMBASSADOR ACADEMY TOWARD INTEGRATING SCIENCE INTO SCHOOL-BASED AGRICULTURAL EDUCATION CURRICULUM

Brian E. Myers, Associate Professor and Associate Chair
Andrew C. Thoron, Graduate Assistant
University of Florida

Gregory W. Thompson, Professor and Department Head
Oregon State University

Abstract

The purpose of this study was to determine perceptions of participants in the 2007 National Agriscience Teacher Ambassador Academy (NATAA) toward integrating science into the agricultural education curriculum. NATAA participants felt that students are more motivated to learn, better prepared in science, provided more opportunities to solve problems, and have a deeper understanding of agriculture when science is enhanced in the agriculture curriculum. Time, support, resources, and funding were recognized as barriers to integrating science. Teachers felt that integrating science had an impact on student enrollment as well as stakeholder support for the agriculture program. Teacher preparation programs are a catalyst to helping teachers learn to integrate science into the program. NATAA participants reported using teacher-oriented inquiry strategies between three and four times per week, while using student oriented inquiry a little over once per month.

Introduction

Agriscience curriculum integration depends largely on the local teacher. Freedom of curriculum decisions has remained at the local level, even with No Child Left Behind legislation (NCLB; USDE, 2006). Allowing agricultural educators to control their classroom content helps meet the needs of the local community (Thompson & Schumacher, 1998). Since the report *A Nation at Risk* (NCEE, 1983), agricultural education has been exploring methods to integrate more science into the curriculum. While science has always been part of agricultural education (True, 1929; Vaughn, 1993), identification of barriers and competence of agricultural education teachers in integrating science with inquiry-based teaching techniques is an important way to gauge integration.

Whent (1992) indicated teachers were reluctant to change from traditional programs to a science-based program because too much science integration could threaten agricultural programs' viability. Several studies indicated benefits or perceived benefits when offering science credit for agriculture courses (Enderlin & Osborne, 1992; Enderlin, Petrea, & Osborne, 1993; Johnson, 1996; Roegge & Russell, 1990; Whent & Leising, 1988). Many years have passed since the inception of the science integration perception studies. Reexamination of a selected group of agriscience educators allows tracking of perceptions of the continued movement toward an integrated science curriculum.

In the past, research has been conducted to establish attitudes and perceptions toward science integration (Balschweid, 2002; Balschweid & Thompson, 2002; Connors & Elliot, 1994; Dyer & Osborne, 1999; Johnson & Newman, 1993; Layfield, Minor, & Waldvogel, 2001; Newman & Johnson, 1993; Peasley & Henderson, 1992; Thompson, 1998; Thompson & Balschweid, 1999; Welton, Harbstreit, & Borchers, 1994). Each of these studies reported the willingness of agricultural teachers to integrate science into their curriculum. The studies also report teachers have positive thoughts toward a more science-based curriculum.

Chiasson and Burnett (2001) reported agricultural education did help science scores in Louisiana. Connors and Elliot (1995) conducted research on achievement scores and found a positive correlation between students enrolled in agriscience education and their achievement on standardized science assessments. Myers, Washburn, and Dyer (2004) declared a need for students to take control of their learning, make decisions, and solve problems. *America's Lab Report* (National Research Council (2006) stated the need for and the importance of laboratory investigation. Diederen, Gruppen, Hartog, and Voragen (2006) stated that laboratory skills are essential for learning objectives and application of reality. Building upon these past findings, this study intends to identify perceptions, barriers, perceived enrollment, and community effects and then begins to relate Agriscience education to inquiry-based instruction.

Because administrators and public schools are consistently asked to strengthen scientific rigor in the curriculum, career and technical education (CTE) programs are expected to justify their curriculum contribution in science, math, and reading (Stewart, Moore, & Flowers, 2004). Myers and Washburn (2007) stated, "Agricultural education programs are not likely to be exempt from these increased expectations (p. 1)."

Integrating science into CTE programs has been called for nationwide. The report titled *A Nation at Risk* and the two previous revisions to the Carl D. Perkins legislation (US Congress, 2006) called for CTE science integration. Thompson and Schumacher (1998) stated science integration could improve the image and quality of agriculture programs. Thompson (1998) stated that integration of science will "academically strengthen vocational courses and make academic courses more relevant (p. 77)."

The theoretical frame for this study is drawn from Ajzen and Madden's (1986) theory of planned behavior. This theory hypothesizes that one's behavior is determined directly by one's intention to perform the behavior. Furthermore, intention is influenced by attitude, subjective (social) norm, and perceived behavioral control. As in previous studies of this kind (Myers & Washburn, 2007), attitudes were operationalized as teacher perceptions toward integration of science. Subjective (social) norms were operationalized as support for integration from various stakeholder groups. Finally, teacher's perceived behavioral control was operationalized by both effect of integration on student enrollment and perceived barriers to integrate science. The assumption of the research is that negative teacher attitudes toward integration, perception of social norms contrary to integration, or perception of lack of control to modify the curriculum would have a negative impact on their likelihood to integrate science.

Purpose and Objectives

The purpose of this study was to determine the attitudes, perceived barriers of integrating science, and the perceived competence of agricultural education teachers in integrating science and use of inquiry-based teaching techniques in agricultural education programs. The objectives of the study were to describe:

1. The perceptions of agricultural education teachers toward the integration of science into the agricultural education curriculum.
2. The perceptions of agricultural education teachers regarding barriers to integrating science into the agricultural education curriculum.
3. Agricultural education teachers' perceptions concerning the impact of science integration on student enrollment in agricultural education programs.
4. Agricultural education teachers' perceptions concerning the impact of science integration on the support they receive from various groups.
5. The perceived competence/ preparation level of agricultural education teachers to integrate science into the agricultural education curriculum.

6. The use of inquiry-based teaching techniques in agricultural education programs.

Methods

This study used a descriptive survey research design. The instrument used in this study was based on two instruments used by other researchers in this field of study (Dunbar, 2002; Layfield et al., 2001; Thompson & Balschweid, 1999; Thompson & Schumacher, 1998). The researchers modified items slightly, when appropriate, to meet the objectives of the study. Teacher responses were measured on a summated rating scale. A panel of experts consisting of faculty, administrators, and graduate students from the University of Florida reviewed the instrument for face and content validity. The authors of the original attitudinal instrument reported internal consistency using a Cronbach alpha of .88 (Thompson & Schumacher). A post hoc reliability analysis of this administration of the slightly revised attitudinal instrument revealed a Cronbach alpha coefficient of .80. The authors of the original use of inquiry-based teaching techniques instrument reported internal consistency using Cronbach alpha of .90 (Dunbar). A post hoc reliability analysis of this administration of the slightly revised inquiry-based teaching instrument revealed a Cronbach alpha coefficient of .81.

The population for the study consisted of all agricultural education teachers participating in the 2007 National Agriscience Teacher Ambassador Academy (NATAA; N = 25). According to L. Gossen (personal communication, August 30, 2007), the teachers chosen to participate in the NATAA were nominated or approved by their state supervisor for agricultural education. State supervisors were given the following criteria for their nomination/ approval for teachers in their state: (1) their best agriscience teachers that were very familiar with science principles or teaching science-based classes, (2) have the respect of the teachers in their state as an excellent instructor, and (3) the commitment to make presentations at professional development meetings.

The instrument was administered during one of the sessions of the NATAA. Data were gathered from all members of the population (100% response rate). Whereas this is a census study, the findings are not generalizable to individuals beyond this population, and only descriptive statistics were used to analyze the data.

Findings

Respondents reported a mean of slightly over seven years of teaching experience. Over three-fourths of the respondents were female (76%). The largest percentage of teachers reported their highest level of education as a master's degree plus some additional graduate courses (36%), followed by a master's degree (32%), bachelor's plus some graduate courses (16%), bachelor's degree (12%), and 4% of the teachers reported holding either a specialist or doctoral degree. Two-fifths (40%) of the teachers reported having taught a subject other than agriculture at some point in their career.

The first objective of this study was to describe the perceptions of agricultural education teachers toward the integration of science into the agricultural education curriculum. All responding teachers agreed science concepts are easier for students to understand when science is integrated into the agricultural education program (Table 1). Furthermore, 88% agreed students are better able to understand agriculture concepts when science is integrated into the program. All of the teachers (100%) also agreed that integrating science increases the ability to teach students to solve problems. Slightly less than two-thirds (64%) of teachers also noted a perception that integrating science requires more preparation than a more traditional curriculum.

The second objective of this study was to describe the perceptions of agriculture teachers regarding barriers to integrating science into agricultural education curriculum. Over two-thirds of the respondents reported insufficient time and support to plan for implementation of integration (68%). Over half (56%) noted a lack of necessary materials for integration was a barrier to integrating science concepts into the agricultural education curriculum (Table 2). A majority of teachers felt insufficient background in science content (56%) and their personal lack of experience in science integration (56%) were also barriers to integration. Most teachers disagreed with the notion that lack of support from local science teachers (68%) and administrators (80%) were barriers.

Table 1
Perception Toward Integration of Science into the Agricultural Education Curriculum

Statement	%A	%N	%D
Science concepts are easier for students to understand when science is integrated into the agricultural education program.	100.0	0.0	0.0
Integrating science into agriculture classes increases the ability to teach students to solve problems.	100.0	0.0	0.0
Students are better prepared in science after they completed a course in agricultural education that integrates science.	100.0	0.0	0.0
Students learn more about agriculture when science concepts are an integral part of their instruction.	88.0	8.0	4.0
Students are more motivated to learn when science is integrated into the agricultural education program.	80.0	20.0	0.0
Integrating science into the agricultural education curriculum more effectively meets the needs of special population students.	80.0	16.0	4.0
Agriculture concepts are easier for students to understand when science is integrated into the agricultural education program.	68.0	20.0	12.0
Integrating science into the agricultural education program requires more preparation time than teaching a more traditional agriculture curriculum.	64.0	16.0	20.0
It is more appropriate to integrate science in advanced courses than into introductory courses.	16.0	20.0	64.0
Less effort is required to integrate science in advanced courses as compared to introductory courses.	16.0	32.0	52.0

Note. $N = 25$. Original scale: 1 = strongly disagree (SD), 2 = disagree (D), 3 = neither agree nor disagree (N), 4 = agree (A), 5 = strongly agree (SA). Responses were collapsed into agree, neither agree nor disagree, and disagree.

Table 2
Barriers to Integration of Science into the Agricultural Education Curriculum

Statement	%A	%N	%D
Insufficient time and support to plan for implementation	68.0	8.0	20.0
Don‘t have the necessary materials	56.0	12.0	28.0
Insufficient background in science content	56.0	12.0	32.0
Lack of experience in science integration	56.0	12.0	32.0
Insufficient funding	48.0	4.0	48.0
Lack of integrated science curriculum in courses I teach	48.0	16.0	36.0
Reluctance to give up the role of primary source of classroom information	41.7	25.0	33.3
Concerns about large class size	40.0	16.0	44.0
Reluctance to diminish emphasis on agricultural production	32.0	16.0	52.0
Lack of support from local science teacher(s)	20.0	12.0	68.0
Lack of administrative support for science integration	16.0	4.0	80.0
Doubts about students‘ capacity to handle material	12.0	20.0	68.0
Lack of parent and community support for science integration	12.0	54.0	64.0
Lack of agriscience jobs in the local community	12.0	12.0	76.0
Disagreement with the notion that science integration is necessary	12.0	4.0	84.0
Concerns about discipline	8.0	16.0	76.0
Have tried it and it was unsuccessful	4.0	24.0	72.0

Note. N = 25. Original scale: 1 = strongly disagree (SD), 2 = disagree (D), 3 = neither agree nor disagree (N), 4 = agree (A), 5 = strongly agree (SA). Responses were collapsed into agree, neither agree nor disagree, and disagree.

The third objective of this study was to describe agricultural education teachers' perceptions concerning the impact of science integration on student enrollment in agricultural education programs. When asked "Have you integrated science into your agricultural education program?" 92% of teachers responded positively. Of those teachers who had integrated science, the majority (59.1%) reported no impact on their program's enrollment, while 40.9% reported an increase in enrollment.

A majority of teachers (64%) reported they were not content with the level to which they currently integrate science. More than 87% of respondents noted that they plan to increase the amount of science integration in their curriculum. No respondent stated that they planned to decrease the amount of integration, with the remainder (12.5%) reporting that they have no current plans to change.

Teachers perceived the greatest enrollment impact of integrating science would be an increase in number of high-achieving students (92%) in agricultural education programs (Table 3). The second greatest impact, from a specific student group, is the increase in the number of average achieving students (72%). Furthermore, a majority (92%) of respondents reported a perception that the overall enrollment in programs would increase with the integration of science concepts.

Table 3
Perceived Impact of Integrating Science on the Enrollment of the Certain Student Groups

Student Group	%I	%N	%D
High-achieving students	92.0	8.0	0.0
Total program enrollment	92.0	8.0	0.0
Average achieving students	72.0	28.0	0.0
Social diversity (athletes, "popular" students, etc.)	56.0	40.0	4.0
Low achieving students	48.0	24.0	28.0
Minority students	32.0	60.0	8.0

Note. $N = 25$. Original scale: 1 = greatly decrease (GD), 2 = decrease (D), 3 = neither increase nor decrease (N), 4 = increase (I), 5 = greatly increase (GI). Responses were collapsed into decrease, neither increase nor decrease, and increase.

The fourth objective of this study was to describe agricultural education teachers' perceptions concerning the impact of science integration on the support they receive from various groups. A majority of teachers perceived support would increase from all groups. The greatest increase in support was from administrators (92%) followed by science teachers (88%).

The fifth objective of this study was to describe the perceived competence/ preparation level of agricultural education teachers to integrate science into the agricultural education curriculum. Table 4 illustrates that most respondents reported that they feel prepared to teach both integrated biological science concepts (80%) and physical science concepts (60%). When asked to comment on teacher preparation programs, 96% suggested that students in those programs be required to complete more science courses. Furthermore, respondents suggested that students complete early field experiences (80%) and student teaching internships (98%) with teachers who integrate science. Responding teachers overwhelmingly supported (100%) the inclusion of instruction on how to integrate science concepts and principles in teacher preparation programs.

The sixth and final objective of this study was to describe the use of inquiry-based teaching techniques in agricultural education programs. This was achieved through the use of two different scales, the teacher inquiry scale and the student inquiry scale (Dunbar, 2002). The teacher inquiry scale asked respondents to indicate the frequency in which they engage in inquiry-based teaching behaviors in their classrooms (Table 5). A grand mean of 3.11 (SD = 0.80) for this scale was calculated from teacher responses as suggested by Nunnally (1978). This can be interpreted as teachers engaging in inquiry-type teaching strategies slightly more than two times a week. The student inquiry scale asked respondents to indicate the frequency in which students in their classes are asked to engage in various inquiry activities (Table 6). The grand mean for this scale was calculated as 3.15 (SD = 0.54). This can be interpreted as, on average, students were asked to engage in inquiry-type activities slightly more than once per month.

Table 4
Preparation to Integrate Science into the Agricultural Education Curriculum

Statement	%A	%N	%D
Teacher preparation programs in agriculture should provide instruction for undergraduates on how to integrate science concepts/principles in agriculture.	100.0	0.0	0.0
When placing student teachers, teacher preparation programs should expect cooperating teachers to model science integration.	96.0	4.0	0.0
Teacher preparation programs in agriculture should require students to take more science courses.	96.0	4.0	0.0
Teacher preparation programs should require that students conduct their early field experiences with a teacher who integrates science.	80.0	16.0	4.0
I feel prepared to teach integrated biological science concepts.	80.0	8.0	12.0
I feel prepared to teach integrated physical science concepts.	60.0	16.0	24.0

Note. $N = 25$. Original scale: 1 = strongly disagree (SD), 2 = disagree (D), 3 = neither agree nor disagree (N), 4 = agree (A), 5 = strongly agree (SA). Responses were collapsed into agree, neither agree nor disagree, and disagree.

Table 5
Teacher Inquiry Scale

	Percentage						
On average, to what extent do you	Never[b]	<1x per week[c]	1x per week[d]	2x per week[e]	3x per week[f]	4x per week[g]	5x per week[h]
Make readily available to students a wide variety of resource materials for scientific investigations	0.0	4.0	28.0	12.0	24.0	8.0	24.0
Use open-ended questions that encourage observation, investigations, and scientific thinking	0.0	0.0	4.0	36.0	28.0	20.0	12.0
Facilitate and encourage student dialogue about science	0.0	16.0	20.0	20.0	24.0	8.0	12.0
Encourage students to defend the adequacy or logic of statements and findings	0.0	0.0	24.0	24.0	24.0	20.0	8.0
Encourage students to initiate further investigation	0.0	8.0	20.0	28.0	32.0	4.07	8.0
Encourage students to design and conduct experiments	4.0	28.0	32.0	8.0	16.0	8.0	4.0
Use a textbook as the primary method for studying agriscience[a]	0.0	16.0	28.0	20.0	24.0	12.0	0.0
Ask a question or conduct an activity that calls for a single correct answer[a]	0.0	0.0	12.0	8.0	24.0	32.0	24.0

Note. $N = 25$. Grand mean = 3.11 ($SD = 0.80$).
[a] Reverse coded for analysis; [b] Coded as 0; [c] Coded as 1; [d] Coded as 2; [e] Coded as 3; [f] Coded as 4; [g] Coded as 5; [h] Coded as 6.

Table 6
Student Inquiry Scale

	Percentage					
How often do you ask students in your classroom to	Never[b]	1x per year[c]	1x per semester[d]	1x per month[e]	1x per week[f]	1x per day[g]
Ask questions during investigations that lead to further ideas, questions, and investigations	4.2	0.0	4.2	25.0	29.2	37.5
Offer explanations from previous experiences and from knowledge gained during investigations	0.0	0.0	4.0	28.0	32.0	36.0
Make connections to previously held ideas (or revise previous conceptions/assumptions)	0.0	0.0	8.3	12.5	29.2	50.0
Communicate investigations and explanations to others	0.0	0.0	12.0	36.0	32.0	20.0
Use data to construct a reasonable explanation	4.0	0.0	8.0	36.0	40.0	12.0
Choose appropriate tools for an investigation	0.0	0.0	12.0	16.0	48.0	24.0
Use investigations to satisfy their own questions	4.2	0.0	25.0	25.0	25.0	20.8
Seek and recognize patterns (trends in data)	4.0	0.0	8.0	40.0	36.0	12.0
Listen carefully to peers as they discuss scientific investigations	0.0	0.0	12.0	40.0	28.0	20.0
Memorize scientific facts or information separately from activities.[a]	12.0	0.0	8.0	40.0	40.0	0.0
Wait for the teacher's explanation before expressing an observation or conclusion[a]	28.0	0.0	16.0	24.0	16.0	16.0
Follow a set series of steps to get the right answer to a question[a]	4.0	0.0	12.0	8.0	52.0	24.0
Wait to act until the teacher gives instruction for the next step in the investigation[a]	12.0	4.0	0.0	36.0	20.0	28.0

Note. N = 25. Grand mean = 3.15 (SD = 0.54).
[a] Reverse coded for analysis; [b] Coded as 0; [c] Coded as 1; [d] Coded as 2; [e] Coded as 3; [f] Coded as 4; [g] Coded as 5.

Conclusions/Recommendations

The conclusions of this study were based on the responses of the agricultural education teachers participating in the 2007 NATAA] (*N* = 25). Although other agriculture teachers who integrate science may have similar perceptions, caution must be exercised when generalizing the results of this study beyond the population. Ajzen and Madden's theory of planned behavior (1986) provides a framework for explaining the potential for integrating science into the agricultural education curriculum based upon the positive perceptions of the National Agriscience Teacher Ambassadors. The planned behavior model indicates that positive perceptions of the NATAA participants toward integrating science into the agricultural education curriculum will influence intentions and behaviors. It can be concluded that since NATAA participants hold positive perceptions toward concepts concerning integrating science, there is potential to integrate more science into the agricultural education curriculum.

Over three-fourths of the teachers in the 2007 National Agriscience Teacher Ambassadors were female. The participants averaged over seven years of teaching experience, and most (68%) held a master's degree. Furthermore, 40% of the teachers reported having taught a subject other than agriculture at some point in their career.

The NAATA teachers responded positively toward student benefits when science is integrated into the agricultural education curriculum. The positive findings of this study toward integrating science and agriculture are similar to results of previous research (Conroy & Walker, 2000; Layfield et al., 2001, Myers & Washburn, 2007; Thompson & Balschweid, 1999; Thompson & Schumacher, 1998). Integration of science into the curriculum will produce more science literate students that understand agricultural concepts and how the connection and application of science is enhanced in the agriculture program. Furthermore, teachers perceived that students are more motivated to learn, better prepared in science, and are provided with more opportunities to solve problems when science is taught in the context of agriculture. The National Agriscience Teacher Ambassadors have been identified as leaders in the teaching profession. They see the value and benefits of integrating more science into the curriculum. As recognized leaders in their states and across the country, it would be beneficial to involve the NAATA participants in developing integrated curriculum, providing workshops, and enhancing efforts to integrate more science into the curriculum. The profession should acknowledge the value of the NAATA teachers and utilize these teacher resources to help better position our profession to meet the needs of our students.

According to the NAATA participants, insufficient time and planning support is the biggest barrier to integrating science in the agricultural education curriculum. Studies of Arkansas (Johnson, 1996), Florida (Myers & Washburn, 2007), Indiana (Balschweid & Thompson, 2002), Oregon (Warnick & Thompson, 2007), and South Carolina (Layfield et al, 2001) agriculture teachers all concurred with these barriers. Lack of sufficient materials to integrate science is another barrier that was agreed upon by the participants in this study. Over one-half of the NAATA participants felt that lack of experience in science integration and a background in science content were barriers to integrating science. Other studies that identified barriers to integrating science (Balschweid & Thomson, 2002; Thompson & Schumacher, 1998; Warnick & Thompson, 2007) disagreed or were neutral toward the finding that agriculture teacher's background in science as a barrier to integrating science.

NAATA teachers felt that integrating science had an impact upon student enrollment in the agricultural education program. Teachers who have already started to integrate science have experienced an increase in enrollment because of more science integration. Teachers felt that enrollment, specifically from high-achieving students, would be a result of integrating science into the agricultural education curriculum. NAATA participants believe that administrators, science teachers, school counselors, parents, other teachers, and community members will support agriculture teachers and programs that integrate science. This finding was consistent with previous studies (Johnson, 1996; Johnson & Newman, 1993; Myers & Washburn, 2007; Thompson & Schumacher, 1998; Warnick & Thompson, 2007).

All of the NATAA participants indicated that teacher preparation programs in agriculture should provide instruction for pre-service teachers on how to integrate science. NAATA teachers identified lack of preparation as a barrier toward integration. NATAA participants also felt that cooperating teachers should model integration of science. Further, almost all of NATAA participants agreed that preservice agriculture teachers should take more science courses at the undergraduate level. This finding is inconsistent with previous findings (Washburn & Myers, 2008). It can be concluded from these findings that NATAA participants recognize the importance of integrating science into the agriculture curriculum. This finding should serve as an important reminder that teacher preparation programs should consider placing student teachers with cooperating teachers that integrate science. It is recommended by participants that teacher preparation programs in agriculture review the amount of science offerings at the undergraduate level to determine if there are appropriate science classes that can be added to the undergraduate program.

Adding more science courses to the preservice teacher's undergraduate curriculum may be difficult in an already crowded teacher preparation curriculum. However, additional experience and knowledge in science through better selection of course work may increase teacher efficacy to enhance science in the agriculture program. Further, agriculture teacher educators should work with teacher educators in science to not only model teaming, but to also help preservice teachers learn the pedagogy of teaching science. Additionally, agriculture teachers should be encouraged to crosswalk their curriculum with science teachers to determine where science standards are incorporated into the agriculture curriculum. Professional development for agriculture teachers should focus on developing science skills and include content pedagogy on how to teach science concepts through the context of agriculture.

Dunbar's (2002) inquiry-based teaching techniques scales provided the basis for investigating the amount of inquiry-based learning that happens in the NAATA teachers' classroom. Data from this study indicated that teachers used inquiry oriented strategies on average between three and four times per week. Furthermore, on average they asked students to engage in inquiry-based techniques more than once per month. These findings indicate the frequency of inquiry-based teaching for NATAA teachers is slightly higher than Florida agriculture teachers (Washburn & Myers, 2008). Although NATAA participants may value inquiry-based strategies, they tend to implement them in more teacher-centered versus student-centered methods. If teachers believe in meeting the National Science Teachers Association's (2007) call for weekly student engagement in inquiry-based data collection and learning, changes will be needed in current practices in the profession. Almost 90% of the NAATA participants indicated they plan to increase the amount of science that is integrated into their curriculum. Professional development may assist teachers in developing strategies and activities to increase the frequency level of student oriented inquiry.

Based on the conclusions of this study, the following recommendations are made for further research:

1. A comprehensive qualitative study of the NAATA participants will help to understand more about those considered leaders in integrating science and the catalyst that caused them to integrate more science into their curriculum.
2. Studies of stakeholders will help identify perceptions and support to help build partnerships in agricultural education programs.
3. Further studies should focus on the impact that integrating science into agricultural education programs has on the number and ability level of students enrolling in agriculture programs.

4. Research is needed to determine the impact and/or relationship of the changing demographic nature of agriculture teachers and science integration.
5. Although the findings of this study aligns with other studies toward the most agreed upon barriers to integrating science, lack of agreement toward teachers' knowledge and background in science was not in agreement with other studies and therefore deserves further study.
6. Research of agriculture teacher's science efficacy may help determine factors that may help prepare teachers to enhance science into the curriculum.
7. Further studies utilizing Dunbar's (2002) inquiry-based teaching techniques scales will help determine the degree of inquiry-based learning in agricultural education.

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BRIAN E. MYERS is Associate Professor and Associate Chair of the Department of Agricultural Education and Communication at the University of Florida, 307A Rolfs Hall, PO Box 110454, Gainesville, FL 32611-0540. E-mail: bmyers@ufl.edu

ANDREW C. THORON is a Graduate Assistant in the Department of Agricultural Education and Communication at the University of Florida, 310 Rolfs Hall, PO Box 110454, Gainesville, FL 32611-0540. E-mail: athoron@ufl.edu

GREGORY W. THOMPSON is Professor and Head of the Department of Agricultural Education and General Agriculture at Oregon State University, 112 Strand Hall, Corvallis, OR 97331. E-mail: greg.thompson@oregonstate.edu.