

Journal of Southern Agricultural Education Research

Volume 67, #1

2017

ISSN 1953-6412

Priority Research Areas:

Agricultural Communications

Agricultural Leadership

Extension Education

Teacher Education and School-based Agricultural Education

Teaching and Learning in Undergraduate and Graduate Academic Programs

Understanding the Food and Fiber System

(Agricultural Literacy)

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Beliefs and Attitudes of 4-H Agents About Global Agriculture Issues

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Quantitative Research

Research Priority Area: Sufficient Scientific and Professional Workforce That Addresses the Challenges of the 21st Century

**JSAER Volume 67, 2017 Outstanding Article*

Beliefs and Attitudes of 4-H Agents About Global Agriculture Issues

Abstract

It is increasingly urgent for 4-H youth to be prepared to enter careers that will provide solutions to complex agricultural challenges including global food security, climate change, and renewable energy resources. Are 4-H agents ready and willing to lead programs that incorporate global concepts and content? According to a national survey of randomly selected 4-H agents nationwide, overall, 4-H agents had favorable personal beliefs and positive attitudes about what youth should learn. They also had a wide variety of personal experiences, but agent beliefs and attitudes did not vary based on those experiences. Results indicate conditions are conducive to agents leading globally-oriented programs. Future research should examine the actual behaviors of 4-H agents.

Introduction

*I pledge my head to clearer thinking, my heart to greater loyalty, my hands to larger service, and my health to better living, for my club, my community, my country, and **my world**.*

Each time 4-H youth and volunteers formally convene, they acknowledge the importance of living in a way that improves their world. Recent national initiatives, such as the *One Million New Scientists* campaign, are driven by a desire to “ensure global competitiveness” by using an approach that is “comprehensive and holistic—from agriculture to climate change to alternative energy” (National 4-H Council, n.d., para. 2).

The importance of preparing the future agricultural workforce has been identified as a key priority for the American Association for Agricultural Education (Roberts, Harder, & Brashears, 2016). In fact, the fifth highest ranked research priority question was “What methods, models, and programs are effective in preparing people to work in a global agriculture and natural resources workforce?” (Roberts et al., 2016, p. 6). In addition, the National Research Council (2009) emphasized the importance of preparing students to work in a global context.

Successfully guiding youth to understand issues of national and international importance while positioning them for success in a global economy will require positive guidance from 4-H agents charged with leading county 4-H programs. Are 4-H agents prepared and likely to lead globally-oriented programs? This study addresses this question.

Theoretical Framework & Review of Literature

Ajzen’s (1991) Theory of Planned Behavior is designed to help predict behaviors and demonstrate the effect of attitudes and personality traits on that behavior. In the Theory of Planned Behavior, three main elements affect a person’s intention to perform a behavior: attitude towards the behavior, subjective norm, and perceived behavioral control (Ajzen, 1991). Attitude towards the behavior includes the person’s perceptions of the consequences of the behavior. The person’s subjective norm is his/her perception of others’ beliefs that the behavior should or should not be performed. Perceived behavioral control is the person’s perceived ease or difficulty

in performing the behavior. These three elements lead to the person's intention to perform the behavior, which leads to actually demonstrating the behavior.

The outcome behavior in question was 4-H agents' leadership of globally-oriented 4-H programming. We focused on the *attitude towards the behavior* element of the Ajzen's (1991) theory. Possible variables influencing *attitude towards the behavior* were identified as agents' attitudes and beliefs about international agriculture, engagement in learning about international agriculture, and past international experiences.

Stevens, Smith, and Downing (2014) found Extension agents in Virginia demonstrated a low interest in engaging in a professional development program to learn about international agriculture. Stevens et al. (2014) postulated "The low interest may be due to the low perceived value of such an experience (by agents or supervisors)...Alternatively, it may have had to do with the difficulty of spending 2 weeks out of the office in May" (Stevens et al., 2014, Conclusions and Future Applications, para. 4). Previous research with county Extension faculty in Florida showed the primary barriers to participation in an international extension experience were financial cost, work obligations, and time commitment (Harder, Lamm, & Vergot, 2010). Agents somewhat disagreed about the barriers of a lack of interest and a lack of supervisor support. The conflicting study results indicate a better understanding of agents' attitudes regarding the value of international engagement is needed.

Specifically within the realm of 4-H, Reaman (1990) found 4-H agents who possessed a positive attitude towards international programs were more likely to be involved in those programs. A 1999 study of Pennsylvania Extension educators found they had an overall positive attitude towards diversity in 4-H/youth development programming (Ingram, 1999). Over 75% of respondents agreed learning about other cultures should be an important part of 4-H (Ingram, 1999).

This topic has also been investigated with other groups with backgrounds similar to 4-H agents. A recent study of secondary agriculture teachers revealed teachers had favorable attitudes regarding what students should learn related to international agriculture (Hurst, Roberts, & Harder, 2015). Personal beliefs of teachers were also positive. Teachers most frequently learned about international agriculture in ways that did not involve travel. International experiences of teachers had negligible impact on teacher attitudes or beliefs (Hurst, et al., 2015).

Although a handful of researchers have examined pieces of this problem, a complete national picture of the beliefs and attitudes of today's 4-H agents related to international agriculture are unknown. This study will fill that gap.

Purpose and Objectives

The purpose of this study was to explore the attitudes and beliefs of 4-H agents concerning global agricultural issues by replicating the work of Hurst et al., (2015). Results of this study could guide the work of people who provide education and training to current and future 4-H agents. The specific objectives of the study were to:

1. Describe the personal beliefs of 4-H agents about global agricultural issues.
2. Describe 4-H agents' attitudes related to what youth should learn about global agricultural issues.
3. Describe how 4-H agents perceive they learn about global agricultural issues.
4. Describe the past international experiences of 4-H agents.
5. Determine if beliefs and attitudes vary based on prior international experiences of 4-H agents.

Methods

A non-experimental quantitative design was used to study the variables of interest. 4-H agents were randomly selected for participation from the contact list provided by the National Association of Extension 4-H Agents (NAE4-HA) in August 2012. Sample size was determined using a desired precision of five percent, a 95% confidence level, and a variability of 50%, indicating maximum variability (Israel, 1992). Given a population of 2769 4-H agents, Israel's recommendations were used to draw a sample of 333 4-H extension agents. Oversampling was conducted to compensate for non-respondents and ensure a suitable sample size, based on response rates in previous research with this population (Reaman, 1990). In total, 1,000 4-H agents were selected for participation. Of the 1,000 4-H agents, 55 individuals were inaccessible due to invalid email addresses and eighteen individuals did not fit the criteria of working with youth or were no longer agents. This reduced the sample size to 927.

The survey was designed on and conducted through Qualtrics. It was modified to fit this audience based on the work of Wingenbach, Boyd, Lindner, Dick, Arispe, and Haba. (2003). The survey's five sections collected data about knowledge, attitudes, beliefs, past international experiences, and demographics. Based on our theoretical framework (Ajzen, 1991), this study used data from the attitudes, beliefs, and demographic sections. Beliefs and attitudes items used a 6 point Likert-type scale as follows: 1 = *strongly disagree*, 2 = *disagree*, 3 = *slightly disagree*, 4 = *slightly agree*, 5 = *agree*, 6 = *strongly agree*. Because the reliability of this instrument was previously established (Wingenbach et al., 2003), the reliability of the instrument was assessed *post hoc*. The attitudes scale about what youth should learn had an alpha of .92 and the belief scale used to assess 4-H agent personal beliefs about global agriculture yielded an alpha of .79.

Participants were contacted through email using the Tailored Design Method (Dillman, Smyth, & Christian, 2009). Pre-notice emails were sent in late September 2012. The pre-notice email was sent from one researcher's university email address. All subsequent emails were sent through the mailing system provided by Qualtrics. Participants received up to five email contacts to maximize response rate. A total of 325 of the 927 4-H agents in the sample completed the survey. An additional 204 agents began or partially completed the survey.

An attempt was made to contact non-respondents by email or by phone in order to compare them to respondents to determine if any significant differences existed (Dillman et al., 2009). Of the 402 4-H agents who did not respond, 155 different agents were contacted by email, eliciting three responses. Since the email follow up to non-respondents was not effective, a random sample of non-respondents was contacted by phone with a request to complete the survey over the phone at that time, online, or to schedule a time to take the survey later. Forty-

two 4-H agents were contacted by phone, resulting in responses from five additional agents, bringing the total number of 4-H agent non-respondents successfully contacted to eight. This resulted in a total of 333 responses for a response rate of 35.9%). Because of the small amount of non-respondent data collected, early and late respondents were compared to determine if any differences existed between the groups (Lindner, Murphy, & Briers, 2001). No significant differences were found to exist between the groups for the variables of interest or demographic characteristics. The respondents' demographic characteristics are summarized in Table 1.

Table 1
Frequencies and Percentages of Demographic Characteristics for Respondents (n = 333)

	<i>f</i>	%
Gender		
Male	72	22.6
Female	246	77.4
Years of Experience (<i>M</i> = 13.29, <i>SD</i> = 9.95)		
1-5	78	25.2
6-10	79	25.5
11-15	43	13.9
16-20	37	11.9
21-25	26	8.4
26-30	22	7.1
31-35	21	6.8
36+	4	1.3
Area in which participant works		
Rural	215	68.0
Suburban	62	19.6
Urban	39	12.3
Family Ancestry		
European	298	93.1
Native American	12	3.8
African	8	2.5
Mexican/Latin American	5	1.6
Asian	4	1.3
Other Caribbean ancestry	2	0.6
Puerto Rican	1	0.3
Pacific Islander	0	0
Arabic	0	0

Data Analysis

Objectives 1 through 4 were assessed with descriptive statistics, including frequencies, means, and standard deviations. Objective 5 was analyzed using ANOVA with partial Eta squared (η_p^2) as a measure of effect size. All significance tests used an alpha level of .05.

Findings

Objective 1: Describe The Personal Beliefs Of 4-H Agents About Global Agricultural issues

4-H agents had overall favorable beliefs about global agricultural issues. The overwhelming majority agreed to some level with all ten statements. The overall scale mean was 5.00 ($SD = .49$). The most agreed upon statement was *international agriculture involves more than farming* ($n = 307$, 97.7% agreed or strongly agreed). Agents least agreed with the statement *competition between producers worldwide keeps food prices low in my grocery store* ($n = 140$, 44.6% agreed or strongly agreed). Complete results about agent beliefs are presented in Table 2.

Table 2
4-H Agent Beliefs About Global Agricultural Issues (n=333)

Belief Statement	Frequency					
	1	2	3	4	5	6
International agriculture involves more than farming	0	0	0	7	115	192
Natural disasters affect the price of food in my local grocery store	0	2	3	16	127	166
Global food production allows me to eat a variety of products all year	0	1	8	33	139	133
Global agriculture is different from one country to another	0	0	9	36	155	114
Understanding other cultures helps U.S. producers market their products abroad	0	1	6	57	168	81
Understanding global politics helps U.S. producers market their products abroad	0	0	8	62	172	72
In times of famine, the U.S. should help other countries with food aid	1	4	15	76	136	82
U.S. agricultural products are superior in quality to products from other countries	2	12	40	107	95	56
The U.S. should actively help other countries develop their agricultural industries	1	0	14	88	126	84
Competition between producers worldwide keeps food prices low in my grocery store	2	14	52	105	100	40
Scale Mean = 5.00; $SD = .49$						
Scale Alpha = .79						

Note. 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree, 6 = strongly agree.

Objective 2: Describe 4-H Agent Attitudes Related To What Youth Should Learn About Global Agricultural Issues

Overall, 4-H agents had favorable attitudes about youth learning about global agricultural issues (scale mean = 5.20, $SD = .65$). 4-H agents agreed with all nine statements. Agents most agreed youth should learn about *agriculture and its importance to the world economy* ($n = 298$, 93.1% agreed or strongly agreed). The least agreed upon statement was that youth should learn

the differences between developed and developing countries ($n = 236$, 73.7% agreed or strongly agreed). Complete results are presented in Table 3.

Table 3
4-H Agent Attitudes About What Youth Should Learn Related to Global Agricultural Issues ($n = 333$)

Youth should learn more about...	Frequency					
	1	2	3	4	5	6
agriculture and its importance to the world economy	4	1	0	17	133	165
how world events affect local agriculture in their community	3	1	4	22	141	147
how world agriculture affects food prices in the local grocery store	3	2	2	26	134	152
agricultural products that their home state sells to other countries	3	1	5	26	153	131
their state's agricultural industry and its connections to world trade	3	1	2	35	141	137
the agricultural products from other countries that are consumed in their state	3	2	3	37	160	113
the cultures of other countries	2	0	8	58	124	127
other countries' markets for U.S. agricultural products	3	2	5	65	153	91
the differences between developed and developing countries	2	2	6	74	149	87
	Scale Mean = 5.20; $SD = .65$					
	Scale Alpha = .92					

Note. 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree, 6 = strongly agree.

Objective 3: Describe How 4-H Agents Perceive They Learn About Global Agricultural Issues

4-H agents learned about global agricultural issues from a variety of ways. The majority of agents ($n = 186$, 58.1%) only agreed or strongly agreed *professional development* helped them learn about global agricultural issues. Less than half of the agents agreed or strongly agreed with the remaining six statements. The least agreed upon statement was *listening to selected radio programs* ($n = 91$, 28.4% agreed or strongly agreed). Complete results are presented in Table 4.

Table 4

4-H Agent Perceptions About How They Learn About Global Agricultural Issues (n = 333)

I learn about global agricultural issues from ...	Frequency					
	1	2	3	4	5	6
professional development	5	11	22	88	127	59
my college classes	22	33	25	89	103	34
participating in study abroad programs	44	56	32	42	72	65
taking vacations in other countries	36	49	32	69	82	42
watching selected television programs	13	34	28	121	94	23
attending events such as fairs or shows	19	45	49	101	77	21
listening to selected radio programs	22	51	42	107	67	24
	Scale Mean = 3.95; SD = .93					
	Scale Alpha = .79					

Note. 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree, 6 = strongly agree.

Objective 4: Describe The Past International Experiences Of 4-H Agents

4-H agents were asked to indicate if they had personally experienced any of ten international or global activities. Greater than half of the agents had *traveled internationally for personal reasons (i.e. vacation, etc.)* ($n = 199, 63.2\%$) and *participated in professional development workshop(s) with a global focus* ($n = 172, 54.6\%$). The fewest 4-H agents *lived outside the U.S. for long periods of time for personal* ($n = 13, 4.1\%$) or *professional reasons* ($n = 13, 4.1\%$; see Table 5).

Table 5

Past International Experiences of 4-H Agents

Experience	<i>f</i>	%
Traveled internationally for personal reasons (i.e. vacation, etc.)	199	63.2
Participated in professional development workshop(s) with a global focus	172	54.6
Took a globally focused course as a <u>student</u>	117	37.1
Integrate global examples or case studies in classes you teach	115	36.6
Participated in a short term study abroad experience as a <u>student</u> (1 to 3 weeks)	55	17.5
Participated in a long term study abroad experience as a <u>student</u> (> 3 weeks)	39	12.4
Lived outside the U.S. for a short duration for <u>professional</u> reasons (< 1 year)	32	10.2
Lived outside the U.S. for a short duration for <u>personal</u> reasons (< 1 year)	22	7.0
Lived outside the U.S. for a long duration for <u>personal</u> reasons (> 1 year)	13	4.1
Lived outside the U.S. for a long duration for <u>professional</u> reasons (> 1 year)	13	4.1

Objective 5: Determine If Beliefs And Attitudes Vary Based On Selected International Experiences Of 4-H Agents

4-H agent beliefs about global issues did not differ if they *had traveled internationally for personal reasons (i.e. vacation, etc.)* ($F = .007, p = .94, \eta_p^2 = .00$). Agent beliefs also did not vary if they had *participated in professional development workshop(s) with a global focus* ($F = .094, p = .76, \eta_p^2 = .00$). Complete results are presented in Table 6.

Table 6

Differences in 4-H Agent Beliefs About Global Agricultural Issues Based on Selected International Experiences

Experience		<i>f</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	η_p^2
Traveled internationally for personal reasons (i.e. vacation, etc.)	Yes	199	5.00	.49	.007	.94	.00
	No	114	5.00	.50			
Participated in professional development workshop(s) with a global focus	Yes	172	4.99	.48	.094	.76	.00
	No	141	5.01	.50			

Similarly, 4-H agents' attitudes about what youth should learn did not vary if they had *traveled internationally for personal reasons (i.e. vacation, etc.)* ($F = .77, p = .38, \eta_p^2 = .002$). Nor did they vary if the agent had *participated in professional development workshop(s) with a global focus* ($F = 1.61, p = .21, \eta_p^2 = .005$). Complete results are presented in Table 7.

Table 7

Differences in Agent Attitudes About What Youth Should Learn Based on Selected International Experiences

Experience		<i>f</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	η_p^2
Traveled internationally for personal reasons (i.e. vacation, etc.)	Yes	199	5.18	.68	.77	.38	.002
	No	116	5.25	.59			
Participated in professional development workshop(s) with a global focus	Yes	172	5.25	.62	1.61	.21	.005
	No	143	5.15	.69			

4-H agents also had a variety of different international experiences that occurred while they were college students. To minimize the effects of time since each agent was in college, only agents with 5 or fewer years of experience ($n = 81$) were included in these analyses. 4-H agents' beliefs did not vary if they had *participated in a short term study abroad experience as a student (1 to 3 weeks)*, *participated in a long term study abroad experience as a student (> 3 weeks)*, or *took a globally focused course as a student*. Complete results are presented in Table 8.

Table 8

Differences in Early Career 4-H Agent Beliefs About Global Agricultural Issues Based on Selected International Experiences

Experience		<i>f</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	η_p^2
Participated in a short term study abroad experience as a <u>student</u> (1 to 3 weeks)	Yes	20	5.05	.62	.004	.95	.00
	No	61	5.06	.51			
Participated in a long term study abroad experience as a <u>student</u> (> 3 weeks)	Yes	14	4.93	.65	.98	.33	.012
	No	67	5.09	.50			
Took a globally focused course as a <u>student</u>	Yes	37	4.97	.52	1.81	.18	.022
	No	44	5.13	.54			

4-H agents' attitudes about what youth should learn were also compared on selected international experiences (see Table 9). Agent attitudes did not vary based on if the had *participated in a short term study abroad experience as a student (1 to 3 weeks)*, *participated in a long term study abroad experience as a student (> 3 weeks)*, or *took a globally focused course as a student*.

Table 9
Differences in Early Career 4-H Agent Attitudes About What Youth Should Learn Based on Selected International Experiences

Experience		<i>f</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	η_p^2
Participated in a short term study abroad experience as a <u>student</u> (1 to 3 weeks)	Yes	20	5.33	.54	.14	.71	.002
	No	61	5.26	.77			
Participated in a long term study abroad experience as a <u>student</u> (> 3 weeks)	Yes	14	5.14	.56	.58	.45	.007
	No	67	5.30	.75			
Took a globally focused course as a <u>student</u>	Yes	37	5.34	.48	.58	.45	.007
	No	44	5.22	.87			

Conclusions, Recommendations, and Implications

Overall, 4-H agents had favorable beliefs about international agricultural issues. The scale mean of 5.0 was very similar to Hurst et al.'s (2015) findings with secondary agriculture teachers. Both groups of educators (agents and teachers) most agreed with the statement *international agriculture involves more than farming*. Results from our study were also consistent with Reaman's (1990) and Ingram's (1999) findings from Pennsylvania Extension educators. From a theoretical perspective, 4-H agent favorable beliefs about international agriculture will influence their attitudes towards the behavior and thus their intention to perform the behavior (Ajzen, 1991). Therefore, 4-H agent positive beliefs mean conditions should be favorable for professional development for 4-H agents and for expanding 4-H programming in this area. State 4-H Specialists should take a closer look at their respective states and programming efforts to identify opportunities in this area.

4-H agents had positive attitudes about what youth should learn about global agricultural issues. This was also very similar to what Hurst et al. (2015) found with secondary teachers, although 4-H agents had a slightly higher scale mean (5.20) than teachers (5.06). Agents agreed with all nine statements and most agreed youth should learn about *agriculture and its importance to the world economy*, which was very similar to their teaching counterparts (Hurst et al., 2015). As noted above, positive 4-H agent attitudes about what youth should learn will also influence their attitudes about international agriculture programming and thus their intentions for the behavior (Ajzen, 1991). Personal beliefs of agents, coupled with favorable attitudes towards what you should learn create a great environment for programming in this area. State 4-H Specialists should examine existing curricula and programming to determine how agents' attitudes about specific topics are addressed.

Agents indicated they learned about global agricultural issues in a variety of ways. Agents agreed most that *professional development* helped them learn about global agricultural

issues. Agents and teachers varied in their most agreed statement, with teachers most agreeing they learned about global agriculture issues from *watching selected television programs* (4th out of 7 items for agents), although the overall scale means were very similar (3.95 for Agents, 3.97 for teachers; Hurst et al., 2015). The differences in learning preferences for agents and teachers may be an indication of differences in job responsibilities and organizational cultures within each profession. Further research on could provide greater insight on this difference. Our results on agents learning through professional development on international agriculture issues contrasts with what Stevens et al. (2014) found in Virginia.

The majority of 4-H agents had *traveled internationally for personal reasons (i.e. vacation, etc.)* and *participated in professional development workshop(s) with a global focus*. These two experiences were high on the teachers' list of experiences, but fewer than half the teachers had either experience (Hurst et al., 2015). In contrast, Harder, Lamm, Ganpat, and Lindner (2011) found a majority of extension agents in Trinidad were willing to travel internationally for professional reasons, especially if it provided hands-on work with other extension professionals. Perhaps those agents had access to different resources. Teachers frequently *integrate global examples or case studies in classes you teach* (56.6%, Hurst et al., 2015), while our results showed only about one-third of agents do the same. Agents least frequently lived outside the U.S. for long periods of time, which was similar to teachers (Hurst et al., 2015). Our result that the majority of agents had participated in a professional development program focused on global agriculture stands in contrast to what Stevens et al. (2014) found, but may be in alignment with Harder et al.'s (2010) observations about interest not being a barrier. Personal experiences of agents likely influence their attitudes, and thus their intentions to integrate international issues in their 4-H programming (Ajzen, 1991). It would be interesting to see how specific international experiences influence individual 4-H agent programming in this area. With over half of the agents traveling internationally for personal reasons, are they using those opportunities to enhance their professional activities at home? Future research should explore this in much greater detail.

4-H agents personal beliefs about international agriculture and their attitudes about what youth should learn did not vary if they had *traveled internationally for personal reasons* or *participated in professional development workshop(s) with a global focus*. This was slightly different than their teaching peers (Hurst et al., 2015) whose personal beliefs were slightly different if they had professional development in the area and attitudes varied if they had traveled abroad, although both differences were very small. Our research did not examine any specific details about professional development experiences or international travel. It is plausible the scope and breadth of agent experiences were quite variable. Future research should take a closer look at specific types of international experiences and professional development programming.

Early career 4-H agents' beliefs and attitudes did not vary if they *participated in a short term study abroad experience as a student (1 to 3 weeks)*, *participated in a long term study abroad experience as a student (> 3 weeks)*, or *took a globally focused course as a student*. This is pretty similar to secondary agriculture teachers (Hurst et al., 2015), although teacher attitudes did vary slightly if they had taken a globally focused course. As noted above, the quality of those individual experiences is unknown. Future research could examine these in much greater detail.

With most colleges of agriculture being called to globalize their programs (National Research Council, 2009), it is reasonable to expect future 4-H agents to leave college with more global experiences than previous generations. Examining the outcomes of specific experiences can provide better insight into the impacts on 4-H agents and ultimately the youth who engage in their programming.

Overall, 4-H agents had favorable personal beliefs and positive attitudes about what youth should learn. They also had a wide variety of personal experiences, but those experiences did not impact their beliefs or attitudes. Results indicate conditions are conducive to agents leading globally oriented programs (Ajzen, 1991). Overall, agents were very similar to their teaching peers (Hurst et al., 2015). Opportunities may exist for collaborative efforts to globalize both 4-H programming and secondary agricultural education curricula.

This study only examined 4-H agent attitudes and beliefs. Globalizing 4-H program will involve changes in behaviors by 4-H agents. Future research should establish benchmarks for the current situation and also examine barriers to implementing global 4-H programming. Longitudinal research examining the impacts of such programming on the youth who participate would also be very helpful.

Researchers intending to survey 4-H agents should take note of the difficulties in obtaining a high response rate. We oversampled the target population by a significant percentage in order to reach the desired sample size, based on response rates obtained by other researchers. It is possible the low response rate may be attributed to (a) low level of interest in agents in the survey topic, (b) low name recognition of the lead researcher with the target population, or (c) general fatigue by a population often surveyed. Future researchers may be well served to consider alternative methods of obtaining data from 4-H agents, such as qualitative methods, particularly when the topic of investigation is not perceived as critical to the role or programming of the target population.

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Agriculture Teachers' Preferred Teaching Partners Based on Physical and Professional Appearance

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Abstract

As new teachers enter the workplace, their ability to integrate into the school's professional community is critical to their job satisfaction. While teachers may meet many quality indicators of good teaching, his or her ability to integrate into a professional community can be shaped instead by coworkers' initial perceptions of his or her physical and professional appearance. In this study, we asked a convenience sample of agriculture teachers attending the National FFA

Convention to select their ideal teaching partners based on their physical and professional appearance. Results displayed a strong preference for male teaching partners, regardless of age and attire. Among female confederates, the younger confederate was selected over 10 times more frequently than the older confederate. Small relationships were revealed between respondents' gender and the confederates' age, respondents' NAAE region and confederates' gender, and the respondents' gender and confederates' gender. Despite recent increases in the number of female agriculture teachers, the results herein suggest men may be desired over females in an already male-dominated industry. Additionally, results suggested that ageism may be a greater concern for females than males within agricultural education. The results herein are not generalizable, but provide a starting point into further inquiry within the profession.

Introduction/Conceptual Framework

Historical trends have long suggested a need for more teachers in agricultural education (Foster, Lawver, & Smith, 2016). Teacher retention has been cited as a method for reducing the teacher shortage, as many open positions are created as a result of teacher attrition (Ball & Torres, 2010). Beginning teachers are especially vulnerable to attrition; “approximately one-third of beginning teachers leave their jobs after three years of teaching, and approximately 40% leave after five years of teaching” (Ball & Torres, 2010, p. 276). As new teachers enter the workplace, keeping them satisfied with their jobs is a critical factor in retaining them within the teaching profession (Ball & Torres, 2010). One aspect influencing teachers' job satisfaction, and ultimately, their decision to remain in a teaching position, is their ability to integrate into the school's existing professional community (Chapman, 1984). While teachers may meet many quality indicators of good teaching, his or her ability to integrate into a professional community can be shaped instead by coworkers' initial perceptions of his or her “physical attractiveness...by their age or race, and by their apparent similarity to [one's] self” (Simons, 1995, p. 22). Regardless of one's noble intentions, “all humans have preconceived notions, biases and abilities that influence the quality of the judgements they make when assessing the competence of [others]” (Wood, 2014, p. 410). These first impressions, made within five to 300 seconds of interaction with an individual (Carney, Colvin, & Hall, 2007), can have significant social consequences on a teacher's ability to connect with other teachers “because they guide how we initially interact with the person, what information we remember about the person and our predictions about future behavior” (Wood, 2014, p. 410).

Contrary to the adage, “you can never tell a book by its cover” (Fuller & Rolfe, 1946), one's initial judgements of others are quite accurate (Wood, 2014). First impressions, also

termed thin slice or zero acquaintance judgements (Wood, 2014), are shaped via observation of physical attributes and behaviors, and have been proven to be accurate in forming judgements of positive and negative affect, extraversion, conscientiousness, intelligence, neuroticism, openness, and agreeableness (Carney et al., 2007). Studies have identified 60-second durations of observation as producing the best ratio of accuracy and time; while accuracy of impressions of one's personality traits increases up to five-minute durations, the increase beyond 60-seconds has been found to be minimal (Carney et al., 2007).

This study focused on how physical and professional attributes of teachers influence other teachers' judgements about them. Barrick, Shaffer, and DeGrassi (2009) found that both physical attributes, including uncontrolled aspects such as gender and age, and professional attributes, including controlled aspects such as attire, influenced interviewers' perceptions of interviewees.

Gender remains an influential characteristic in impression forming. Snyder, Tanke, and Berscheid (1977) concluded that among partnered participants asked to converse with one another for 10 minutes, males with negative impressions of their female partner's attractiveness treated them in a less friendly manner than they did females whom they judged to be attractive. Kierstead, D'Agostino, and Dill (1988) found that female teachers were perceived to be better instructors when they displayed behaviors indicative of friendliness, while the same behaviors in male teachers did not affect students' perceptions of their instructional quality.

Age also plays a part in interpersonal judgements (North & Fiske, 2013). Descriptive stereotypes of older individuals focus on "illness, incompetence, invisibility, and irrelevance" (North & Fiske, 2013, p. 720); studies have found that within groups, elders are avoided in an effort to bolster group self-worth and favoritism for the fittest (Burnstein, Crandall, & Kitayama, 1994; Kite & Wagner, 2004). Within the teaching profession, older beginning teachers face "considerable discrimination" when competing for jobs with younger applicants (Redman & Snape, 2002, p. 355). Perceptions among peer teachers regarding older colleagues have displayed notions that older teachers are "less up to date in their subject knowledge, inflexible in their attitudes, unwilling to adapt to change, and less willing to engage in out of school activities" (Redman & Snape, 2002, p. 355).

Finally, numerous studies have focused on the role of teacher attire in the forming of impressions. Morris, Gorham, Cohen, and Huffman (1996) found that while students perceived more formally dressed teachers as more knowledgeable, intelligent, and competent, they were also perceived as less likable or approachable. Carr, Lavin, and Davies (2009) reported that instructors wearing informal clothing, operationally defined as a sweater and jeans, were perceived as approachable and flexible but not well-respected. Similarly, Butler and Roesel (1989) found that teachers dressed in suits were viewed by students as most teacher-like, but least preferred.

Approximately 3,443 school-based agriculture programs across the nation employ multiple agriculture teachers (J. B. Bledsoe, personal communication, September 30, 2016), suggesting their personal and professional appearance both influences teachers' impressions of one another and influences others' perceptions of both the individual teachers and the collective

agriculture program (Damhorst, Miller-Spillman, & Michelman, 2005; Freeburg & Workman, 2009). Serving as one another’s coworkers, the professional identities of teachers within multi-teacher agriculture programs play a vital role in the program’s social environment (Schneider, 1987). Further, teachers choose whether to welcome others in to their social environments, work or otherwise, based on how they perceive the new-comer’s personal and professional appearance (Damhorst et al., 2005; Lennon & Miller, 1984; Wood, 2014). Teacher retention depends on the ability of newly employed agriculture teachers to successfully integrate in to a shared professional community, and their ability to do so is influenced by the first impressions other teachers form based on their physical and professional attributes. Therefore, this study aims to investigate how teachers perceive the personal and professional attributes of other agriculture teachers when forming first impressions.

Theoretical Framework

The theoretical framework of this study is rooted in Chapman’s model for teacher attrition/retention (1984) (Figure 1) and expectancy violations theory (EVT) (Burgoon, 1993).

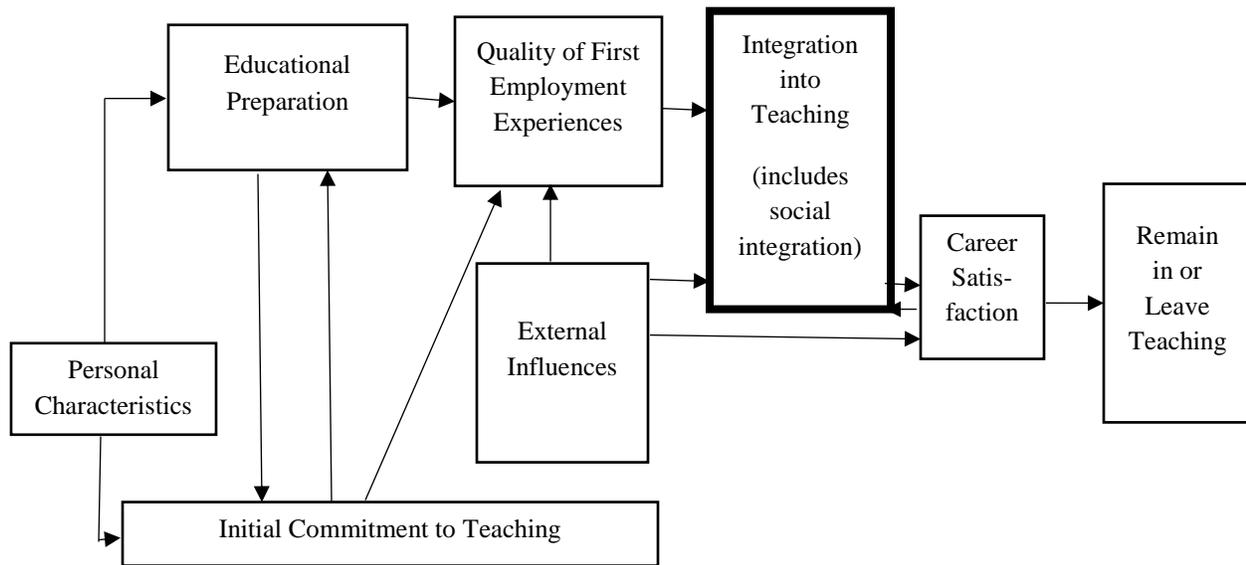


Figure 1. Chapman’s model for teacher attrition/retention (1984) (bold added).

Chapman’s model depicts the factors that lead to a teacher’s decisions to remain in or leave the teaching profession. Integration into a professional community of teachers is included within Integration to Teaching (Chapman, 1984), bolded here for emphasis. As teachers form first impressions of new or potential coworkers, they do so through the lens of their own expectations of what a teacher, or in this case, an agriculture teacher, should be. Expectancy violations theory asserts that cultural norms establish expected interpersonal communication patterns, and that violations to these expectations draw attention due to their novelty (Dunbar & Segrin, 2012). Violations can be viewed positively or negatively, and shape how individuals perceive other aspects of the individual’s message.

Violations to one's expectations can only occur if expectations are first established within a society. Currently, 54% of public school teachers are between the ages of 30-49 (United States Department of Education, 2012). Within agricultural education, 55% of agriculture teachers are male (Foster, Lawver, Smith, & Thompson, 2016); in the past, the ratio male to female agriculture teachers has been skewed to a greater degree, with males holding the majority of teaching positions (Kelsey, 2006). Expectations regarding teacher attire have also been set. The majority of school dress codes specifically prohibit attire that would be considered inappropriate for the roles of the educator. While an exact definition of inappropriate dress has not been agreed upon, media materials have labeled inappropriate articles as those that are sexually revealing, or violates conventional norms for teachers (Workman & Freeburg, 2010).

Purpose/Objectives

The purpose of this study was to describe the association between agriculture teachers' demographic attributes and their selection of preferred teaching partners based on the physical attributes of gender and age and the professional attribute of selected attire. The following objectives guided the study:

1. Describe respondents' genders, ages, geographic locations, and community types.
2. Describe the frequency with which respondents selected teaching partners displaying specific demographic characteristics and types of attire.
3. Describe the associations between respondents' demographic characteristics and the demographic characteristics of their selections of preferred teaching partners.
4. Describe the associations between respondents' demographic characteristics and the attire of their selections of preferred teaching partners.

Methods

This study used a correlational design to describe the relationship between agriculture teachers' demographic characteristics and their selections of preferred teaching partners. We collected data over a two-day period using a convenience sample at the 2015 National FFA Convention exposition. The exposition features booths and exhibits from universities, companies, and organizations across the nation, and draws the attendance of "thousands of [FFA] advisors" (National FFA Organization, 2016, para. 1). Teachers were recruited as they passed the study booth, which was located in a central area of the exposition center. Once their roles as current agriculture teachers were confirmed, respondents were each given a response form on which they indicated their gender, age, and zip code. Respondents were asked to complete the response form and then were verbally given a scenario in which they were able to hire an additional agriculture teacher for their current program. On the table in front of the respondents, boxes presenting images of the potential teaching partners were displayed. Respondents were instructed to view each of the potential teaching partners and place their response forms in the box displaying the teacher they would prefer to work with in their agriculture program. Following the procedures of Morris et al. (1996), we displayed headless images of trained confederates of different ages (20s and 40s) and genders (male and female) dressed in two categories of attire. Sartorial categories included business casual (dress shirt or blouse, dress slacks or skirt, dress shoes), or casual (polo shirt or plain shirt, jeans or khakis, and

boots or shoes) (Morris et al., 1996) (see Table 1). Attire categories were operationalized using previously established norms for business and casual attire (Fraz, 2001), and were evaluated for validity by an expert in apparel merchandizing.

Table 1
Teacher Confederates and Their Attire

Photograph Identification	Gender	Age	Attire
A	Female	20s	Casual
B	Male	40s	Business Casual
C	Female	40s	Casual
D	Male	20s	Casual
E	Female	40s	Business Casual
F	Male	20s	Business Casual
G	Female	20s	Business Casual
H	Male	40s	Casual

Images of confederates were displayed on white backgrounds for consistency. Boxes on which confederates' images were displayed were opaque with small holes for response submissions, preventing respondents from viewing one another's selections. (see Figure 2).



Figure 2. Respondents selected their preferred teacher by placing their response forms in the corresponding box.

Data was analyzed using SPSS v. 22. Respondents' demographic characteristics and selections of preferred teachers were analyzed via descriptive statistics, including means, standard deviations, and frequencies. Rural-Urban Continuum Codes were utilized to identify the community type of each respondents' provided zip code (United States Department of Agriculture, 2012). While nine community types are recognized by the Rural-Urban Continuum Codes, for ease of analysis, we condensed codes to indicate urban (codes 1-3), micropolitan (codes 4-6), and rural (codes 7-9). The magnitude of any relationships between respondents' characteristics and their selections were analyzed using Cramer's V (ϕ_c), which measures "the strength of association between two categorical variables" (Field, 2006, p. 695). While Cramer's V is calculated following chi-square analysis, which tests for statistical significance of an association between categorical variables (Field, 2006), the convenience sample used for this study limits findings to the sample. Inferential statistics such as the chi-square analysis are inappropriate when findings are not intended to be generalized to a larger population; therefore,

results of the chi-square analyses are not reported. Results of each Cramer's V were interpreted using Cohen's (1988) guidelines, wherein small effect sizes are those of 0.1, medium effect sizes are those of 0.3, and large effect sizes are those of 0.5.

Results/Findings

The first objective sought to describe respondents' genders, ages, geographic locations, and community types (Table 2). Responses were received from 400 agriculture teachers during the two-day data collection period.

Table 2
Respondents' Demographics

Characteristic	<i>f</i>	%
Gender		
male	262	65.5
female	138	34.5
Age		
20-29	115	28.8
30-39	129	32.3
40-49	98	24.5
50-59	56	14.0
≥60	12	3.0
NAAE Region		
I	39	9.8
II	84	21.0
III	74	18.5
IV	123	30.8
V	52	13.0
VI	26	6.5
Community Type		
Urban	146	36.5
Micro	75	18.8
Rural	173	43.3

Nearly two-thirds (65.5%) of respondents were male, while 61% were under 40 years of age. All six regions of the National Association of Agricultural Educators (NAAE) were represented, with Region IV being represented to the greatest degree (30.8%) and Region VI being represented to the least degree (6.5%). Teachers most frequently taught in rural communities (43.3%) and least frequently taught in micropolitans (18.8%).

The second objective sought to describe the frequency with which respondents selected teaching partners displaying specific demographic characteristics and types of attire. The most frequently selected teacher was the younger male dressed in casual attire ($n = 89$), while the least frequently selected teacher was the older female dressed in casual attire ($n = 3$). It should be noted that all male confederates were selected more frequently than female confederates (Table 3).

Table 3
Confederates selected as preferred teaching partners

Confederate	<i>f</i>	%
Younger, male, casual	89	22.3
Older, male, business casual	75	18.8
Younger, male, business casual	73	18.3
Older, male, casual	66	16.5
Younger, female, casual	48	12.0
Younger, female, business casual	41	10.3
Older, female, business casual	5	1.3
Older, female, casual	3	0.8

The third objective sought to describe the associations between respondents' demographic characteristics and the demographic characteristics of their selections of preferred teaching partners (Table 4).

Table 4
Strength of Associations Between Respondent and Selected Confederate Variables

Association	ϕ_c	Interpretation (Cohen, 1988)
Respondent Gender*Confederate Age	.146	Small
Respondent NAAE Region*Confederate Gender	.112	Small
Respondent Gender*Confederate Gender	.105	Small
Respondent NAAE Region*Confederate Age	.097	Negligible
Respondent Age*Confederate Age	.089	Negligible
Respondent Age*Confederate Gender	.075	Negligible
Respondent Community*Confederate Gender	.069	Negligible
Respondent Community*Confederate Age	.044	Negligible

The gender of respondents was associated with the selected confederates' age and gender to a small degree. Seventy-three percent of the female respondents chose younger confederates, while 58% of the male respondents chose younger confederates. Seventy-nine percent of the male respondents ($n = 207$) and 70% of the female respondents ($n = 42$) selected male confederates. A small association was also found between the NAAE region in which the respondents taught and the gender of their selected teachers (Table 5). Male teachers were chosen by the majority of respondents in all NAAE regions.

Table 5
Frequency of Selection of Male Teaching Partners by Respondents' NAAE Region

Respondents' NAAE Region	<i>f</i>	%
I	29	74.4
II	68	88.3
III	50	67.6
IV	91	74.0
V	38	73.1
VI	21	80.8

The fourth objective sought to describe the associations between respondents' demographic characteristics and the attire of their selections of preferred teaching partners. Cramer's V scores indicated negligible relationships between respondents' gender and the attire of their selected teaching partners ($\phi_c = .062$), respondents' age and the attire of their selected teaching partners ($\phi_c = .021$), and respondents' community type and the attire of their selected teaching partners ($\phi_c = .064$).

Males selected confederates dressed in business casual attire 50.8% of the time ($n = 133$), while females selected confederates dressed in business casual attire 43.5% of the time ($n = 60$). Between 47% and 48.5% of respondents under 29 years of age, between 30 and 49 years of age, and aged 50 and over selected confederates dressed in business casual attire. Urban respondents selected teaching partners dressed in business casual attire 52.7% of the time ($n = 77$), while similarly dressed confederates were selected by metropolitan respondents 43.4% of the time ($n = 33$) and by rural respondents 46.33% of the time ($n = 81$). A small relationship was found between the NAAE region in which respondents taught and the attire of their selected teaching partners ($\phi_c = .114$) (Table 6).

Table 6
Frequency of Selection of Teaching Partners Dressed in Business Casual Attire by Respondents' NAAE Region

Respondents' NAAE Region	<i>f</i>	%
I	17	43.6
II	39	46.4
III	32	43.2
IV	69	56.1
V	21	42.0
VI	11	42.3

Teachers from Region IV selected confederates dressed in business casual attire at least 10% more than any other region. Teachers from Region V selected these more professionally dressed confederates least frequently.

Conclusions/ Recommendations/Implications

The findings gleaned from this study are not generalizable beyond the sample; however, they do provide a starting point for researchers to consider trends within agricultural education hires. Results from this study yielded an overwhelming preference for male teachers; 75.8% of respondents selected male confederates. While more male respondents than female respondents selected male teaching partners, over half of both genders preferred male teaching partners. The profession of school-based agricultural education has been dominated by males, but shifts in recent decades have led to growth in the number of females employed as agriculture teachers (Whittington & Raven, 1995). With preservice teacher programs reporting a female demographic of up to 64% (Foster, Lawver, & Smith, 2016), further research must be conducted to better understand why both male and female agriculture teachers within this sample preferred to work

alongside a male. The tenets of EVT may suggest that males align more with society's expectations of the agriculture teacher, as has been seen historically (Kelsey, 2006; Whittington & Raven, 1995).

Additionally, a small relationship was found between respondent gender and confederate age, with female respondents selecting younger confederates at a higher rate than their male counterparts. This relationship was stronger than that between respondent age and confederate age. As the nation continues to experience a shortage of agriculture teachers and seeks ways to recruit more high school graduates to enroll in postsecondary agricultural education programs, recruiters can assure younger graduates of the ease with which they can integrate into professional communities who are eager to welcome them. However, further research should be conducted to explore reasons for female respondents' preference of younger teachers more than their male counterparts, as mid-career moves are common among millennials (Arthur & Rousseau, 1996). Perhaps females feel the tension of holding employment within a traditionally male-dominated profession, and perceive younger teaching partners as more accepting of their roles as leaders in the agriculture program. While we offer this as a possible hypothesis, qualitative research could provide a more thorough investigation of this phenomenon.

While results did not suggest a preference for younger males over older males, they did suggest ageism may be a concern for female agriculture teachers, as the younger female confederate was selected over 10 times more frequently than her older counterpart, regardless of attire. Redman and Snape (2002) posited that older teachers are discriminated against, which again, was found only among female confederates. Older teachers entering the workforce as a second career could alleviate some of the strain within agricultural education caused by the teacher shortage (Redman & Snape, 2002); therefore, research should investigate teachers' perceptions regarding new teachers who are older than the traditional college graduate. By understanding ageism within agricultural education, particularly directed toward females, teacher educators can prepare graduates to overcome ageist stereotypes and integrate more successfully within existing teaching communities.

Little difference was observed between selection of confederates based on clothing; slightly over half of the respondents (51.5%) selected teachers dressed in casual attire, while slightly under half (48.5%) selected teachers dressed in business casual attire. This 3% difference implies that when selecting between teaching partners that were dressed in business casual and casual attire, respondents as a whole did not value one style over another to any substantial degree. Similar results regarding teachers' credibility based on clothing by Dunbar and Segrin (2012) concluded that there was no significant difference between teachers who dressed moderately and those who dressed formally. However, business casual and casual attire are only two styles of clothing, and they fall toward the center of the clothing continuum's level of professionalism. Further research should be conducted to determine whether teachers value these two more moderate styles of clothing over those more casual or more professional.

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4-H Members' Motivating Factors for and Deterrents to Participation in an International Experience Program: Development of the *4-H International Experience Program Questionnaire*

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Quantitative Research

Research Priority Area: Efficient and Effective Agricultural Education Programs

4-H Members' Motivating Factors for and Deterrents to Participation in an International Experience Program: Development of the 4-H International Experience Program Questionnaire

Abstract

As transportation and communication systems evolve, the ability of youth to participate in international experience program (IEP) improves. However, not all youth will choose to participate in an IEP even if an IEP is readily available. Understanding the motivating factors for participation in an IEP and deterrents to participation in an IEP can assist program developers better market available experiences. In order to assess factors that inhibit or promote participation in an IEP, valid and reliable instruments are needed. This study describes the development and initial validation of the 4-H International Experience Program Questionnaire, an instrument designed to measure 4-H members' motivating factors for participation in an IEP and deterrents to participation in an IEP.

Introduction

The need to adopt a global perspective poses challenges for U.S Cooperative Extension, particularly regarding international program opportunities for 4-H members (Etling, Reaman, & Sawi, 1993). Examination of the 4-H members' perceptions of motivating factors and deterrents associated with participating in an international experience program (IEP) may assist in explaining their intention to participate in an IEP. Understanding members' intention to participate in an IEP can further international experience (IE) programming efforts and potentially lead to increased participation in an IEP (Stroud, 2010). According to Etling et al. (1993), an examination of the deterrents and benefits associated with such programs is a necessary measure to reducing deterrents and enhancing international programming. Reported deterrents to 4-H members' participation in an IEP include: (a) financial constraints; (b) lack of information; and (c) lack of support by family, friends or community (Boyd et al., 2001). Despite the deterrents, 4-H members were motivated to participate because they perceived the experience would be worthwhile and impactful to their lives (Boyd et al., 2001). In another study by Cater, Bunch, and Danjean (2016), prior intercultural experiences predicted 4-H members' intention to participate in an IEP. This effect was partially explained by motivating factors such as youths' perception that participation in an IEP increased their employability which resulted in an increase in youths' perceived intention to participate in an IEP; however, deterrent factors such as time, reduced both motivation and intention to participate in an IEP (Cater et al., 2016).

This study seeks to fill a void in the youth international experience literature for valid and reliable survey instruments that measure youths' attitudes toward an IEP. Specifically, attitudes in this study are operationalized as motivating and deterring factors to participation in an IEP. Little research exists regarding 4-H members' perceptions of IEPs and their associated perceived motivating factors and deterrents to participation. Much of the existing literature has become dated, and the surrounding body of literature is lacking overall (Arnold, Davis, & Corliss, 2014). Additionally, the methodological approach used in many studies has been limited and lacks the use of formally developed and tested instruments. To date, there is seemingly no valid and reliable instruments to measure 4-H members' perceptions of motivating factors and deterrents to

participation in an IEP. As such, there is a need to develop an instrument to measure these variables.

Conceptual Framework

The Predisposing, Reinforcing, and Enabling Constructs in Educational/Ecological Diagnosis and Evaluation—Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development (PRECEDE-PROCEED) model was used as the guiding framework for this instrument (Green & Kreuter, 2005). The framework encompasses eight phases that provide a structure for understanding social problems, developing and implementing an intervention, and evaluating proximal and distal program outcomes. PRECEDE is dedicated to understanding a problem and includes a series of phases that lead up to an intervention while PROCEED is devoted to the implementation and evaluation of the program.

The questionnaire developed and described in this paper, phase three of the PRECEDE section of the model, Educational/Environmental Diagnosis and Evaluation, was used. This phase of the model consists of predisposing factors, enabling factors, and reinforcing factors. These factors are particularly relevant when studying 4-H members' intention to participate, and ultimate participation, in an IEP. Predisposing factors include variables like "knowledge, attitudes, beliefs, values, and perceptions that facilitate or hinder motivation" (Green & Kreuter, 2005, p. 14). Enabling factors comprise "skills, resources, or barriers that can help or hinder" (p. 15) change, while reinforcing factors involve influential reward and feedback mechanisms following a behavior change. Predisposing and enabling factors were considered when developing this questionnaire because of their practical relevance to designing programs that promote 4-H member participation in an IEP, creating training for 4-H professionals and volunteers that lead an IEP, and building marketing campaigns for a 4-H IEP.

Purpose and Objectives

The purpose of this study was to develop an instrument that measured 4-H members' perceived motivating factors for participation in an IEP and deterrents to participation in an IEP. This study was guided by the following objectives:

1. Determine if instrument items cluster into latent constructs that can be used to describe participant attitudes.
2. Determine if constructs describing participant attitudes are internally consistent.

Methods

Population and Sample

The target population for the study reported here was 7th through 12th grade 4-H members who attended a three-day 4-H conference at [State] University. Responses were collected from 628 of the 789 4-H members for a response rate of 80%. Random assignment was used to divide the 4-H members into two groups. Data from group one ($n = 314$) were used to develop the instrument, while group two data ($n = 314$) were used to test a model of prior intercultural experiences, motivating factors to participation in an IEP, deterrents to participation

in an IEP, and intentions to participate in an IEP (Cater et al., 2016). The remainder of this paper reports results using data from group one.

The majority of the 4-H members were female ($n = 194$; 61.8%). Members were predominantly white ($n = 237$; 77.2%), with 42 (13.7%) identifying their race as African American and the remainder ($n = 28$; 9.1%) as other. Seven members did not report race. All members were between 13 and 19 years of age ($M = 15.4$; $SD = 1.5$). Grade level ranged from 7 to 12 ($M = 10.5$; $SD = 1.4$). Twelve members did not report age, and 25 did not report grade level.

Instrument Development

The original instrument chosen for this study was developed to examine the motivators and barriers influencing College of Agriculture undergraduates' decisions to participate in international experiences (Bunch, Lamm, Israel, & Edwards, 2013; Reiger, n.d.). Since the original study, the instrument was modified and used with college freshmen in agriculture and undergraduates in other Colleges of Agriculture outside of the original study (Bunch, Blackburn, Danjean, Stair, & Blanchard, 2015; Danjean, Bunch, & Blackburn, 2015). Moreover, previous researchers had not reported if latent constructs existed. Because the existing instrument was not designed for middle and high school-aged youth and latent constructs were not reported, the need to modify the instrument for middle and high school-aged students and report latent variables is warranted.

Items for the instrument, *4-H International Experience Program Questionnaire*, were modified from questionnaires developed by Bunch et al. (2013) and Reiger (n.d.) to measure motivating factors for participation in an IEP, nine items from the Bunch et al. (2013) were used verbatim ($n = 7$) or modified ($n = 2$). The two items were modified by removing the words (a) academic, (b) specialization, (c) academic, (d) advisor, and (e) department and adding the words (a) 4-H, (b) agent, (c) career, (d) interest, (e) international, and (f) setting to construct items that are more appropriate for a high school audience. The item "Get a graduate degree" was not used since it was not relevant to middle and high school students. Response categories were modified by changing the response labels from not important, not very important, somewhat important, and very important to not at all important, somewhat unimportant, somewhat important, very important to create a more balanced set of options.

Deterrents to participation in an IEP were measured using eight items ($n = 8$) modified from Reiger (n.d.) and seven items ($n = 7$) modified from Bunch et al. (2013). The eight items were modified by striking words such as (a) degree, (b) credit hours, and (d) major. Further, words were inserted such as (a) international 4-H experiences, (b) 4-H, and (c) programs to make them more relevant to a middle and high school audience. The items "Potential for being victim of crime, terrorism, or unjust government action," "Don't have academic qualifications to study abroad," "Don't have foreign language skills," and "Potential for contracting diseases in foreign countries" were not used since they were not deemed relevant to or appropriate for middle and high school students and this study. The seven items from Bunch et al. (2013) were modified by striking the words (a) study abroad, (b) University, (c) academic departments, and (d) professionally. As such, words were inserted to speak to a middle and high school audience.

Specific words included were (a) international 4-H experiences, (b) 4-H programs, and (c) academically.

Data Collection

A hard copy questionnaire was distributed to 4-H members on the final evening of the conference. The instruments were distributed by 4-H youth educators who were trained in the data collection protocol. Youth educators received a data distribution checklist outlining the steps in the process. This process included instructions about distributing the instrument, maintaining participants' right to refuse to complete the instrument, and returning the instrument to the researchers.

Data Analysis

Descriptive statistics were used to summarize demographic data. Since the items and response categories had been substantially altered, the questionnaire was treated as a newly developed instrument. Thus, exploratory factor analysis (EFA) with principal axis factoring and promax rotation was used (Tabachnick & Fidell, 2007). Promax rotation allowed for correlated factors. The appropriateness of the data for exploratory factor analysis was assessed through examination of sample size, communalities, Kaiser-Meyer-Olkin (KMO) statistic, and Bartlett's test of sphericity. An *a priori* decision was made to use a 20-to-1 observation-to-item ratio to minimize sampling error (Hair, Black, Babin, & Anderson, 2009). Additionally, extracted communalities would be inspected to establish a range of 0.5 as a minimum (MacCullum, Widaman, Zhang, & Hong, 1999).

Sampling adequacy was assessed through inspection of Bartlett's test of sphericity and the KMO statistic with an expectation that a significant *p*-value for Bartlett's test and a KMO statistic greater than 0.6 would ensure that sufficient correlation existed among items to allow for extraction of factors (Tabachnick & Fidell, 2007). A value of 0.9 or greater and a determinant exceeding zero were set as indicators of multicollinearity or lack thereof, respectively (Field, 2009). The number of factors extracted was determined by using a minimum cut-off value of 1.0 extracted eigenvalue. Internal consistency reliability was assessed using Cronbach's alpha.

Results

Objective 1: Determine if items cluster into latent constructs

The purpose of objective one was to determine if the items clustered into latent constructs. The sample was reviewed to determine if sample size was large enough to produce a result with precision of loadings and stability that would be replicable across samples. The 15-to-1 observation-to-question ratio in this study was slightly less than adequate to reduce sampling error (Hair, Black, Babin, & Anderson, 2009). However, with a median value of .492, a mean value of .504, and values ranging from .237 to .634, communalities suggested that the sample was within the range to be considered adequate to reduce sampling error (MacCullum, Widaman, Zhang, & Hong, 1999).

The KMO was .91 and Bartlett's test of Sphericity was significant ($\chi^2_{(210)} = 2880.9, p < .001$), which demonstrated that there was sufficient correlation among the items to make them appropriate for factor analysis (Dziuban & Shirkey, 1974). The correlation matrix was checked

for cases of extreme multicollinearity by reviewing the item intercorrelations and the determinant. Item intercorrelations ranged from -.012 to .696, and the determinant was greater than zero, supporting the assumption of an absence of multicollinearity (Field, 2009). An eigenvalue cut-off of 1.0 was used to determine the number of factors. After extraction, two factors that explain 50.37% of the cumulative variance were returned (see Table 1).

Table 1
Summed Squared Factor Loadings and Total Variance Explained for Items in the 4-H International Experience Program Questionnaire

Factor	Eigenvalues	Percentage of Variance
1 – Motivating Factors for IEP Participation	6.88	32.7
2 - Deterrents to IEP Participation	3.70	17.60

The original instrument contained 15 items representing the factor Deterrents to IEP Participation. Examination of the pattern matrix yielded three items (11B, 11F, and 11G) that contributed little to the factor with loadings less than .40, thus they were removed from the construct. Twelve items remained in Factor 1 (see Table 2). The factor represented members' perceptions of deterrents for participation in an IEP. Regarding Factor 2, the original instrument contained nine items. All nine items remained in the factor Motivating Factors for IEP Participation and displayed pattern matrix loadings greater than .40 (see Table 2). This factor represented members' perceptions of motivating factors for participating in an IEP. The correlation between the two factors was -.27.

Table 2
Pattern Matrix, Communalities, and Structure Matrix for the Motivating Factors for and Deterrents to IEP Participation Subscales

Variable	Pattern Matrix			Structure Matrix	
	Factor 1 ^a	Factor 2 ^b	h ²	Factor 1 ^a	Factor 2 ^b
Deterrents Item 1	.50	-.08	.32	.48	.06
Deterrents Item 2	.71	-.02	.46	.70	.18
Deterrents Item 3	.65	-.02	.45	.64	.15
Deterrents Item 4	.67	-.00	.51	.67	.18
Deterrents Item 5	.76	.09	.60	.79	.29
Deterrents Item 6	.70	-.06	.57	.68	.13
Deterrents Item 7	.76	.02	.63	.76	.22
Deterrents Item 8	.76	.05	.47	.77	.25
Deterrents Item 9	.77	.08	.44	.79	.29
Deterrents Item 10	.80	-.05	.24	.79	.17
Deterrents Item 11	.76	.01	.49	.76	.22
Deterrents Item 12	.68	-.08	.41	.66	.10
Motivating Item 1	-.00	.57	.45	.15	.57
Motivating Item 2	.01	.67	.63	.20	.68
Motivating Item 3	.01	.67	.47	.19	.68
Motivating Item 4	.03	.70	.58	.22	.71

Variable	Pattern Matrix			Structure Matrix	
	Factor 1 ^a	Factor 2 ^b	h ²	Factor 1 ^a	Factor 2 ^b
Motivating Item 5	.02	.77	.59	.23	.78
Motivating Item 6	.00	.75	.63	.21	.75
Motivating Item 7	.06	.78	.62	.27	.79
Motivating Item 8	-.08	.70	.58	.11	.68
Motivating Item 9	-.13	.68	.44	.05	.65

Objective 2: Determine the internal consistency reliability of constructs

Objective two sought to establish the internal consistency reliability of each construct. Motivating Factors for IEP Participation had a Cronbach's alpha reliability coefficient of 0.92 with a 95% confidence interval of 0.91 to 0.93. The reliability coefficient for Deterrents to IEP Participation was 0.89 with a 95% confidence interval of 0.87 to 0.91.

Conclusions, Recommendations, and Implications

This study describes the development of an instrument to measure the perceived motivating factors and deterrents of 4-H members regarding their participation in an IEP. The instrument consists of 21 items and two constructs. Specifically, there are 12 items included in construct one (Deterrents to International Experience Program Participation) and nine items in construct two (Motivating Factors for International Experience Program Participation). While many studies have focused on college students (Briers, Shinn, & Nguyen, 2010; Bunch et al., 2013; Bunch et al., 2015; Danjean et al., 2015), few quantitative measures exist for use with 4-H youth audiences. This instrument may be particularly useful within a context where information concerning the predisposing and enabling factors that guide youths' intentions, and ultimately their behaviors, informs program planning.

The results of this study suggest that the instrument is a viable tool for use in assessing 4-H members' perceived motivating factors and deterrents to participating in an IEP. EFA established initial construct validity with two factors extracted. The quality of the solution is affected by factors like sample size, inter-item correlations, variance explained by the solution, and factor loadings. While the sample size was slightly less than ideal, as dictated by conventional wisdom (Hair, Black, Babin, & Anderson, 2009), it met the criteria for acceptability under data-driven criteria with communalities meeting the minimum standard. Regarding limitations to the study, it should be noted that the cumulative percentage of variance extracted for the scale was 50.37%. According to Pett, Lackey, and Sullivan (2003), there are no specific guidelines for minimum variance extraction; however, 60% is typically deemed acceptable (Hair, Black, Babin, & Anderson, 2009). With Factor 1 loadings ranging from .5 to .8 and Factor 2 loadings ranging from .57 to .77, the quality of the factor solution is well within accepted guidelines (Thompson, 2004). As researchers continue to investigate the perceived motivating factors and deterrents among 4-H members regarding their participation in an IEP, additional items should be included in the scale.

Future research is needed to confirm construct validity in diverse populations. Convergent validity of the instrument should be established by looking at the relationship

between high motivation and high perceived deterrents to participation and actual behavior (i.e., participating in an IEP). High motivation should predict higher participation behavior while high perceived deterrents should predict low participation behavior. While convergent validity was not established with this study, the weak relationship between the motivating factors and deterrents constructs implies divergent validity; however, readers are cautioned that convergent validity of the constructs with some other measure (e.g., actual IEP participation) should be established. Additionally, future research may focus on the addition of one or more constructs to improve the cumulative percent of variance explained.

Note: Interested individuals may contact J.C. Bunch for information about using the questionnaire.

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Investigating Structured Communication between Teacher Candidates and Cooperating Teachers at Multiple Universities

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Quantitative Research
Research Priority Area: Meaningful, Engaged Learning in All Environments

Investigating Structured Communication between Teacher Candidates and Cooperating Teachers at Multiple Universities

Abstract

Preservice teaching experiences lay the foundation for agricultural education graduates to enter the teaching field (Lawver & Torres, 2011). The overall teacher candidate experience allows candidates to develop lessons and lead classroom learning events while participating in courses that allow them to actually be “students of education” (Edgar, 2007, p. 2). Furthermore, teaching-efficacy has shown to impact individual’s entrance to the field of teaching (Wolf, et al., 2010). The purpose of this study was to assess teaching efficacy and the relationship of teacher candidates and cooperating teachers via a structured communication instrument. To determine if a difference existed in teaching efficacy an ANOVA was used. The overall model was not significant (Between Groups, $F = .57$ and $p = .69$). Further analysis determined that no significant differences were seen in teacher candidates’ perceptions towards teaching when cooperating teachers’ use a communication tool (Between Groups, $F = 1.63$ and $p = .18$). Additionally, no significant difference was found between universities based on overall teaching efficacy and teacher candidate cooperating teacher ratings. Even though no significance was found between universities on teaching efficacy when the cooperating teacher uses the communication tool, it should be noted that the overall relationship with the teacher candidate has the possibility to effect the teacher candidates’ willingness to teach agriculture after graduation. Further research should be conducted to see the direct effects of the behaviors, personal factors, and the environment of preservice teaching. It is also suggested that future research be conducted to define the specifics of the behavioral factors, environmental, and personal factors in terms of agriculture education.

Introduction

Education in agriculture (agricultural education) at the secondary level is facing a crisis due to a shortage of qualified, dedicated, and passionate teachers (Kasspervauer & Roberts, 2007a). This shortage can be explained by taking a closer look at the preservice teaching experience to examine if efficacy and motivation is a deciding factor in teacher candidates’ willingness to enter the profession (Robinson, Krysher, Haynes & Edwards, 2010).

The relationship between cooperating teacher and teacher candidate has been found to be one of the key elements that affect the overall teaching efficacy of candidates and their decision to enter the teaching field after graduation (Edgar, 2007; Edgar, Roberts, & Murphy, 2011,2008; Kasspervauer et. al, 2007a; Roberts, Greiman, Murphy, Ricketts, Harlin, & Briers 2009; Roberts, Harlin, & Briers, 2007, Roberts, Harlin, & Ricketts, 2006; Roberts Mowen, Edgar, Harlin & Briers, 2007, Stripling, Ricketts, Roberts & Harlin, 2008; Wolf, 2011; Wolf et al., 2010). Institutions at the post-secondary level are still trying to determine the reason for teacher shortages (Lavver & Torres, 2011). Wolf (2011) suggested that studying teaching efficacy may be the potential solution to the teacher shortage in agricultural education. Preservice teaching experiences lay the foundation for agricultural education graduates to enter the teaching field (Lawver & Torres, 2011). Thus, the overall teacher candidate experience allows candidates to

develop lessons and lead classroom learning events while participating in courses that them to actually be “students of education” (Edgar, 2007, p. 2).

Teaching-efficacy has shown to impact individual’s entrance to the field of teaching (Wolf, et al., 2010). Wolf et. al (2010) reported that “candidates reported a favorable view of their preparation, although their preparation was lower than their perceived sense of teaching efficacy” (p. 44). Wolf et. al (2010) also indicated that verbal feedback had a moderated positive relationship to candidates overall teacher self-efficacy. Teaching efficacy was originally defined by Berman, McLaughlin, Bass, Pauly, and Zellman (1977) as “the extent to which a teacher believes he or she has the capacity to affect student performance” (p. 137). Self-efficacy and teaching efficacy can be directly related to the environment in which the individual interacts with. During the preservice teaching experience teacher candidates are exposed to several types of environments such as direct feedback, student compliments, personal confidence, classroom behaviors of students, support by cooperating teacher and school administration but the major environmental factor that research has indicated as the most important was communication between cooperating teacher and teacher candidate concerning feedback (Edgar, 2007; Edgar et al., 2011; Edgar et al., 2008; Kasspervauer et al., 2007; Roberts et al., 2007a; Roberts et al., 2007b; Roberts et al., 2006; Shute, 2007; Whittington, McConell, & Knobloch, 2006; Wolf, 2011). Edgar (2007) further elaborated that structured communication played a vital role in understanding the relationship between the teacher candidate and cooperating teacher.

This study used structured communication (communication tool) to encourage communication about teacher candidate’s performance. The communication tool acts as the channel for cooperating teachers to provide feedback and recommendations to teacher candidates. Performance evaluations acted as a way for teacher candidates to grow and develop skills affecting their perceived classroom teaching abilities. Dewey (1981) suggested that meaning happens from language which is a two way street consisting of a sender and receiver in developing meaning and understanding. Researchers (Edgar et al., 2011; Edgar, et al., 2008; Roberts et al., 2007; and Wolf, 2011) stated that teacher candidates gain knowledge about effective teaching when the cooperating teaching is willing to share ways of improvement. Congruent with this premise, Demoulin (1993) challenged cooperating teachers to “foster unique teaching techniques and give support and encouragement to teacher candidates” (p. 160).

The purpose of this study was to assess teaching efficacy and the relationship of teacher candidate and cooperating teacher via a structured communication instrument (tool). This study was a replication of a study done by Edgar (2007) but accomplished on a more diversified group as recommended. The reason for replicating this study was to determine if teacher candidates’ perceptions changed throughout the semester at multiple universities in order for the results to be more applicable to field experiences as a whole. Structured communication affects teacher candidates because it requires them to have a conference with the cooperating teacher on a bi-weekly basis in order to receive feedback on what he/she is doing right and what needs improvement so at the end of the preservice teaching experience they feel they are capable of effectively operating their own classroom. Research done by Edgar (2007) indicated that cooperating teachers are not effectively communicating with teacher candidates during the preservice teaching experience. His findings suggested that by using structure communication,

cooperating teachers along with teacher candidates are required to communicate better on what the teacher candidate is excelling in and what the teacher candidate could do to improve on.

Theoretical Frameworks

As explained by Bandura (1986) the social cognitive theory attempts to explain how people acquire and maintain certain behavioral patterns. According to Rotter (1954), “the major or basic modes of behaving are learned in social situations and are inextricably fused with needs requiring for their satisfactions the mediation of other persons” (p. 84). Bandura (1997) regarded self-efficacy as one of the most important factors contributing to an individual’s behavior. The idea that every individual has the potential to influence change, regardless of their skill level, was the key to the social cognitive theory (Pajares, 2002). Social learning theory can be used to explain and predict individual or group behavior and used to help identify ways in which behavior can be modified or changed for favorable outcome (Whittington et al., 2006). Pajares (2000) stated that social cognitive theory is “a view on human behavior in which the beliefs that people have about themselves are key elements in the exercise of control... in which people are producers of their own environments and social systems” (p. 2). Bandura (1986) summarized the social cognitive theory by saying that “what people think, believe and feel effects how they behave” (p. 25).

From the social cognitive theory standpoint, the teacher candidate and cooperating teacher relationship and teacher candidates’ perceptions of their abilities to teach influenced their behavior (Bandura, 1997). The relationship between teacher candidates and cooperating teachers have a major effect of the observational learning that takes place during the student teaching experience. Observational learning according to Schunk et al. (2008), expanded the range and rate of learning over what could occur if each response had to be performed and reinforced for it to be learned. Therefore, teacher candidates’ value the perceptions of their relationship with their cooperating teacher (Edgar, et al., 2008). Their perceptions of their ability to teach was a reflection of self-efficacy based off the social cognitive theory.

Self-efficacy was defined by Bandura (1986) as “people’s judgments of their capabilities to organize and execute courses of actions required in order to attain designated types of performance” (p. 391). Self-efficacy affects willingness to participate in activities, amount of effort put forth on a specific task and persistence to continue when task seems challenging. This theory postulates that individuals with high efficacy had intrinsic interest and deep engrossment in activities. Bandura (1997) concluded that “efficacy is a generated capability in which cognitive, social, emotional, and behavioral skills must be organized to serve innumerable purposes” (p. 17). Individuals with high-efficacy approach challenging and demanding tasks with assurance that they can exercise control over them and have the staying power to overcome obstacles and set-backs (Bandura, 1994; Wolf, 2011).

Teaching efficacy was originally defined by Berman, Mclaughlin, Bass, Pauly, and Zellman (1977) as “the extent to which a teacher believes he or she has the capacity to affect student performance” (p. 137). Tschannen-Moran and Hoy (2001) defined teaching efficacy as “... a judgment about his or her capabilities to bring about desired outcomes of student engagement and learning, even among those student who might have learning difficulties or are

simply unmotivated” (p. 1). Edgar, et al. (2011) added that teaching efficacy was more of a personal factor and defined teaching efficacy (Tschannen-Moran et al., 1998) based on “ the teacher’s belief in his or her capabilities to organize and execute action required to successfully accomplish a specific teaching task in a particular context” (p. 22).

Tschannen -Moran et al., (1998) realized that many teacher candidates lack the understanding or complexity of teaching. Therefore, teacher candidates expectations change because their roles change and realize their expectation of students in the learning environment and actual student commitment to learning are different causing caps between teacher and learner (Edgar, 2007). In terms of instruction and classroom management, Bandura (1993) suggested that classroom environment is related to teacher’s instructional efficacy. Teachers who have more instructional efficacy use more of class time for instruction and provide students who have difficulty learning with the help they need (Gibson & Dembo, 1984). Teachers with high instructional efficacy tend to “foster mastery experiences for their students,” according to Bandura (1994, p. 140). Personal teaching efficacy has been found to increase during the first year of teaching.

Many researchers conducted studies focused on the student teaching experience as a “capstone” event for preservice candidates (Edgar et al., 2011; Edgar, 2007; Kasperbauer & Roberts, 2007a; Roberts et al., 2007; Roberts et al, 2009; Wolf, (2007). Edgar et al., (2011) elaborated on the relationship of cooperating teachers and teacher candidates by concluding that a students’ perceived teaching efficacy and age was a positive factor in the relationship between teacher candidate and cooperating teachers. Roberts, Harlin, and Briers (2007) assessed the relationship of teacher candidate and cooperating teachers’ relationship based on personality type. The researchers noted that the personality type of a cooperating teacher greatly influenced the overall efficacy and relationship of the teacher candidates.

SMCR (Source-Message-Channel-Receiver) guides the framework of this study towards communication. The channel was considered the most important factor the SMCR model analyzes for this study. The channel can come in two ways: verbal and written. Verbal channels include one-on-one sit down session where the cooperating teacher provides suggestions to the teacher candidate, informal talks during lunch, and round table talks with other teachers if in a multiple teacher program. Written channels includes weekly journals where the cooperating teachers writes down suggestion and notes on how the teacher candidate can improve, structured communication tool where the teacher rates the teacher candidate on different constructs, or any other means of writing down their observations of the teacher candidate.

For the purpose of this study the receiver (SMRC) is the teacher candidate, because they are the intended receiver of the information given through structured communication. Feedback is given through the communication tool and it is the job of the receiver/teacher candidate to take the feedback and incorporate in to improve or ignore feedback. The teacher candidate and cooperating teacher feedback can have a direct relationship towards teaching efficacy. If feedback is always negative, teaching efficacy will decrease while if the feedback is positive teaching efficacy will increase. In the case of teacher candidates and cooperating teachers, noise could be comments made by students, parents, school faculty, or community leaders. Figure 1 displays the conceptual and theoretical frameworks of this study.

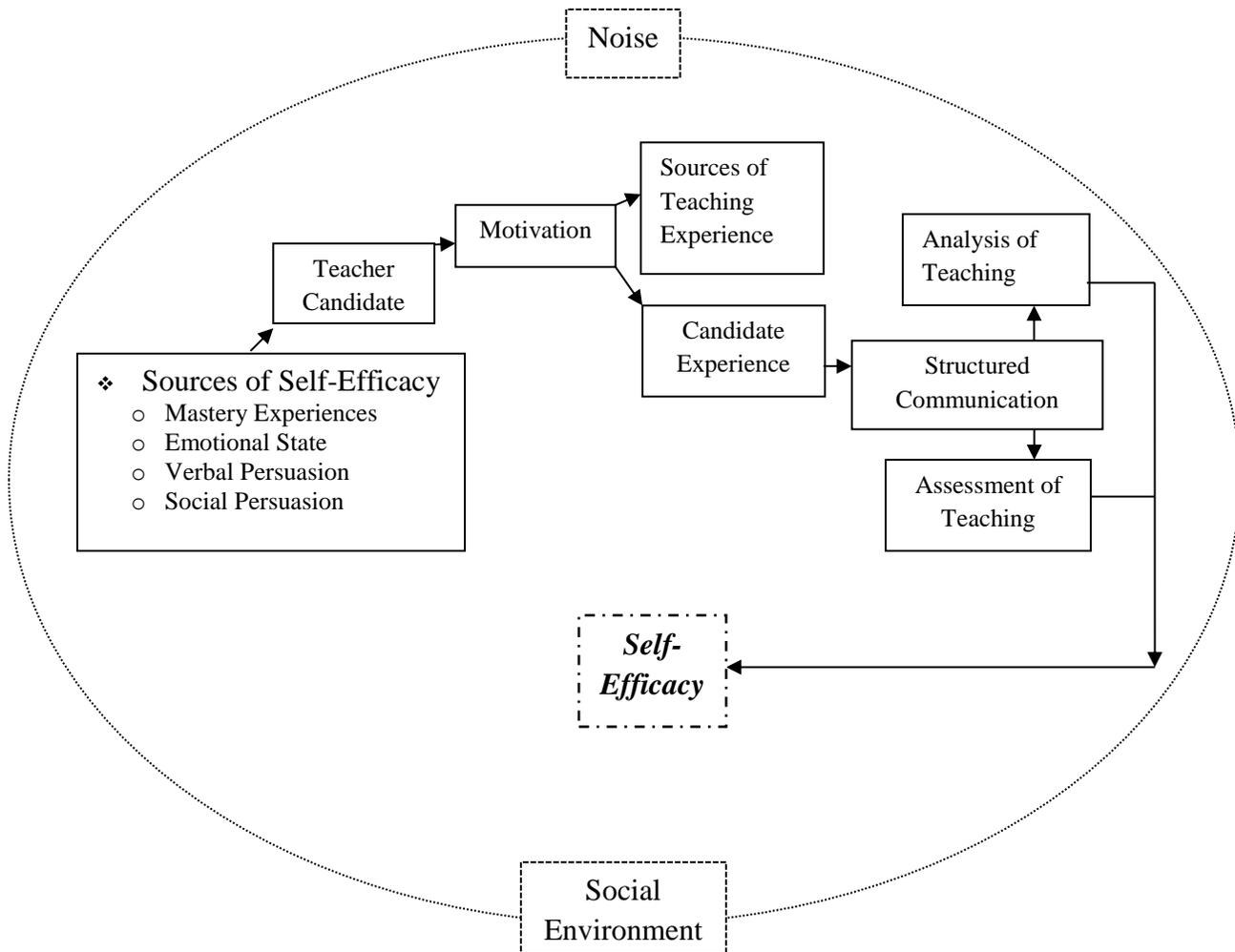


Figure 1. Conceptual and theoretical framework model. Adapted from Edgar, 2007.

Methodology

The purpose of this study was to assess teaching efficacy and the relationship of teacher candidates and cooperating teachers via a structured communication instrument that allows for direct feedback from the cooperating teacher to the teacher candidate in an effort to determine if teacher candidates' perceptions of their teaching abilities change throughout the semester.

This study was guided by the following hypotheses:

H₀₁: There will be no significant difference in teaching efficacy based on cooperating teachers' use of a communication tool between universities.

H₀₂: There will be no significant difference in teacher candidates' perceptions towards teaching when cooperating teachers' use a communication tool.

H₀₃: No significant difference will be found between universities based on overall teaching efficacy and teacher candidate cooperating teacher ratings.

This study used a quasi-experimental design with a non-random sample through a time-series design (#14) (Campbell & Stanley, 1963). Campbell and Stanley (1963) defined: "a quasi-experimental design as there are many natural social settings in which research persons can introduce something they lack the full control over the scheduling of experimental stimuli which makes it a true experiment" (p. 34).

A priori was set at .05 (alpha) according to reviewed literature and the concerns of committing a type two error. The research was conducted based off the following design:

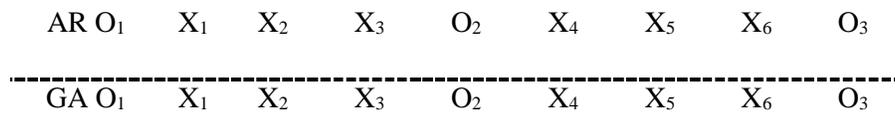


Figure 2. Research design for study at two universities.

A typical student teaching semester begins with course work (block) for the first four weeks of the semester. The final twelve weeks of the semester are considered the student teaching experience. The first measurement of teaching efficacy (O₁) was taken during the last week of block classes or the fourth week of the teacher candidate experience. The second measurement of teaching efficacy (O₂) was taken during the sixth week of the 12 week student teaching experience at a mid-semester meeting between teacher candidates and their respective university (University of Arkansas and University of Georgia) supervisor. The third (O₃) and concluding teaching efficacy measurement was taken at the end of the 12 week student teaching experience. The experimental variable (Structure Communication Form) (X_n) was introduced at the beginning of the 12 week student teaching experience, at the conclusion of the four week block course. The experimental variable was collected every other week for twelve weeks. The independent variable was identified as the communication between teacher candidate and cooperating teacher. The treatment in this study requires structure and measurement which was normal during student teaching.

The target population of this study was individuals enrolled in an agricultural education department with a teacher certification program which requires the student teaching experience at two purposely selected states. Data was collected the University of Arkansas (N = 27) in the spring of 2012 (n = 12) and 2013 (n = 15) and the University of Georgia (N = 32) in the spring of 2012(n = 12) and 2013 (n = 20). Participants from the University of Arkansas resulted in 100% participation and incomplete results from a few participants from University of Georgia resulted in a 94% response rate. Teaching efficacy data was collected at three points during the semester.

The communication instrument (tool) in this study is an adaption used by the Department of Education at Florida State along with Texas A&M University. The communication tool

contained 12 sections of accomplished practices of the teacher candidate. The cooperating teacher was required to assign a ranking of Outstanding; Accomplished; Progressing; Needs Improvement; or Not Applicable or observed. The cooperating teacher and teacher candidate filled out the communication form every other week for the 12 weeks of the student teaching experience resulting in six conferences held. There was a comment and recommendation section for every suggested practice that the teacher candidate should complete. The comments and recommendations was presented to the teacher candidate in order for teacher candidates to constantly improve and have a valuable student teaching experience.

In order to measure teaching efficacy Tschannen-Moran and Woolfolk Hoy (2001) developed a Teachers Sense of Efficacy Scale (TSES) also known as the Ohio State Teaching Efficacy Scale (OSTEES). This instrument contains 24 items based off three major constructs, which each constructs has eight items. The three constructs are engagement, instruction, and classroom management. The reliability coefficient (Cronbach's Alpha) for Engagement was .87, Instruction was .91, and Classroom Management was .90.

In order to study the relationship between teacher candidate and cooperating teacher a researcher developed instrument (Edgar et al., 2008; Kasperbauer & Roberts, 2007b; Roberts, 2006) was utilized to collect perception data of teacher candidates about their relationship with their cooperating teacher. The instrument was designed to coincide with the background/demographics and teaching efficacy instrument. The cooperating teacher/teacher candidate relationship portion consisted of 43 items. Teaching/instruction construct consisted of nine statements, professionalism and personality constructs consisted of 10 statements a piece, while teacher candidate/cooperating teacher construct had 14 statements. The scale was used to establish the describe characteristics of the cooperating teacher as perceived by the teacher candidate. Face and construct validity was established through an expert panel of experts (Edgar 2007) and the reliability coefficient (Cronbach's Alpha) for the relationship question was .78.

Findings

Participants in this study were 50.2% female with the remaining indicating male as gender. A major percentage of students identified themselves as being 21 (33.9%) or 22 (33.9) years of age and ranged in age from 21 to 27 years of age. The majority of participants identified themselves as white (89.8%) with the second largest group being Native Hawaiian or Pacific Islander (6.8%). The remaining participants reported being American Indian/Alaskan Native (1.7%) and one participant (1.7%) did not accurately report ethnicity and was removed from this portion of the study. The greatest amount (57.6%) of respondents indicated they were enrolled in seven to eight semesters of high school agriculture with the rest indicating 1 to four semesters of secondary agriculture classes.

Hypothesis One

Hypothesis one stated that there will be no significant difference in teaching efficacy based on cooperating teachers' use of a communication tool between universities. The independent variable under examination was the communication tool, while the dependent variable was teacher candidates teaching efficacy. To determine if a difference existed in

teaching efficacy an ANOVA was used. Table 1 displays the results found. The overall model was not significant (Between Groups, $F=.568$ and $p=.687$). The null hypothesis was accepted.

Table 1

ANOVA of Overall Teaching Efficacy

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η^2
Between Groups	4	1.43	.37	.57	.69	.04
Within Groups	54	33.93	.63			
Total	58	35.36				

Hypothesis Two

Hypothesis two stated that there will be no significant difference in teacher candidates' perceptions towards teaching when cooperating teachers' use a communication tool. The dependent variable under examination was teacher candidates' perceptions of teaching. The independent variable under study was the communication tool used by cooperating teachers. To determine if a difference existed in teacher candidates' perceptions towards teaching, an ANOVA was used (see Table 2). The overall model was not significant (Between Groups, $F=1.631$ and $p=.180$). The null hypothesis was accepted.

Table 2

ANOVA of Overall Teacher Candidate Perception of Teaching

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>	η^2
Between Groups	4	.33	.08	1.63	.18	.11
Within Groups	54	2.70	.05			
Total	58	3.03				

Null Hypothesis Three

Null Hypothesis three stated that no significant difference will be found between universities based on overall teaching efficacy and teacher candidate cooperating teacher ratings. To determine if there was difference in teaching efficacy and teacher candidates/cooperating teacher relationship a MANOVA was used to test the hypothesis. The dependent variables under study include teaching efficacy and teacher candidate's perceptions of their relationship at multiple universities. The use of the communication tool by the cooperating teacher was the independent variable under examination. Table 3 illustrates the effects of the independent variable (structured communication) upon the dependent variables (teaching efficacy (TE) and relationship level (RL) measured at three points throughout the preservice teaching experience. A Pillai's Trace significance value of .149 with an $F=1.548$. Effect size (η^2) calculated at .10 and power at .66. The overall model was not significant therefore the null hypothesis was accepted.

Table 3

MANOVA of Teaching Efficacy and Teacher Candidate/Cooperating Teacher Relationship

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
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Model						
	TE	4	1.43	.36	.57	.15
	RL	4	1.84	.46	2.44	
Error						
	TE	54	33.93	.63		
	RL	54	10.16	.19		
Total						
	TE	58	35.36			
	RL	58	12.00			

Conclusion and Recommendations

Because the sample (teacher candidates enrolled in the field experience at the University of Arkansas and the University of Georgia) under study was not randomly selected, the following conclusions were drawn on based on the findings and apply only to the population of this study.

1. When cooperating teachers use a communication tool during the preservice teaching experience there is no overall significant difference in preservice teachers' teaching efficacy at multiple universities.
2. When cooperating teachers use a communication tool during the preservice teaching experience there tends to be no overall significant difference in preservice teachers' perceptions towards teaching at multiple universities.
3. When cooperating teachers' use a communication tool during the preservice teaching experience there tends to be no significant difference in teaching efficacy based off the teacher candidates/cooperating teacher relationship.

Discussion and Implication

The purpose of this study was to assess teaching efficacy and the relationship of teacher candidate and cooperating teacher through a structured communication instrument at multiple universities. This study attempted to examine the factors that affect preservice teachers such as motivation, teaching efficacy, and the relationship between the cooperating teacher and preservice teacher.

Null Hypothesis One

There was no significant difference in teaching efficacy based on cooperating teachers' use of a communication tool between universities. Teaching efficacy was originally defined by Berman, Mclaughlin, Bass, Pauly, and Zellman (1977) as "the extent to which a teacher believes he or she has the capacity to affect student performance" (p. 137). Edgar, et al. (2011) added that teaching efficacy was more of a personal factor and defined teaching efficacy based off. (Tschannen-Moran et al., 1998) as "the teacher's belief in his or her capabilities to organize and execute action required to successfully accomplish a specific teaching task in a particular context" (p. 22). Even though no significance was found, through ANOVA analysis, in teaching efficacy when the cooperating teacher uses a communication tool it should be noted the

preservice teachers efficacy increased from the beginning of the student teaching experience to the end of the preservice teaching experience which correlates to previous research by Edgar, 2007; Kasspervauer & Roberts, 2007a; Roberts et. al., 2009; Whittington et. al., 2006, Wolf et al., 2010).

Roberts et al. (2007) suggested that teachers who believe strongly in their teaching efficacy will be more likely to foster self-efficacy in their students through development of challenging and engaging learning environments. Teacher candidate's expectations change because their roles change. Preservice teachers also realize their expectation of students in the learning environment and actual student commitment to learning. Research by Edgar (2007) identified the difference in learning environment and student commitment to address the gap between teachers and learners.

Null Hypothesis Two

Determining what motivates college graduates to enter the field of teaching can be address by looking at individual expectations and individual success. Harm and Knobloch (2005) suggested that "needs theory relates to job satisfaction, when the three higher orders of needs (self-esteem, autonomy and self-actualization) were major factors in job satisfaction than teachers with lower satisfaction" (p. 103). Data analysis proved there was no significant difference in teacher candidates' perceptions towards teaching when cooperating teachers' use a communication tool.

In terms agriculture education internal motives typically don't play a role in an individual's reasoning for pursuing a career as an agriculture educator. Shoulders and Myers (2011) concluded that beliefs come from various areas of an individual's life. Shoulders & Myers (2011) also noted that social beliefs shape a professional's identity and is one factor of why they are motivated to teach. In order to further examine teacher candidates' perception of teaching examination of the demographic information of willingness to teach agricultural science and plans after graduation. In terms of willingness to teach agricultural science the participants had a higher likelihood to teach agriculture science at the beginning of the student teaching, while there was decrease in willingness to teach by the end of the student teaching experience. The preservice teachers' plans after graduation leads the researcher to believe that the preservice teaching experience provides actual work experience and opens up other possibilities for the teacher candidates who realize they are not ready to teach just yet. The data analysis of plans after graduation indicated that preservice teachers were more likely to teach agriculture right after graduation but by the end of the student teaching experience the participants were unsure of their plans after graduation. Three major causes can be attributed to the decline in teacher candidates' willingness to teach after graduation. Causes being the relationship with their cooperating teachers, their personal belief of their teaching efficacy, and the overall preservice teaching experience.

Null Hypothesis Three

Determinism as considered by Bandura (1978) were simply "understanding actions determined by a sequence of causes." Schunk, (2000) further addressed human behavior by saying that "triadic reciprocity or reciprocal interaction among behavior, environmental variables, and personal factors" (p.80). Reciprocal determinism is used in the study to examine

the cyclical nature of the student teaching experience (behavior), age, gender, teaching efficacy(personal factors), and relationship between cooperating teacher and teacher candidate (environment). The concept of reciprocal determinism is the major component of the social cogitative theory which is used at foundation theory for this study. No significant difference will be found between universities based on overall teaching efficacy and teacher candidate cooperating teacher ratings. A MANOVA was used to test the hypothesis and to determine if there was difference in teaching efficacy and teacher candidates/cooperating teacher relationship. Even though no significant was found it should be noted that the personal factors, behavior, and the environment has the potential effect the overall preservice teaching experience.

To better understand the effects of the communication tool examination of the structured communication should be examined. This study identified the receiver will be the teacher candidate, because the teacher candidate is the intended receiver of the information given through structured communication. Feedback is given through the communication tool and it is the job of the receiver/teacher candidate to take the feedback and incorporate in to improve or ignore. The relationship between the cooperating teacher and the teacher candidate was directly related to the communication tool. Roberts et al. (2006) concluded that teacher candidates' perceptions of the relation between cooperating teachers and teacher candidates were not an indicator of the teacher candidate's desire to teach. Therefore, it was important to note that the relationship between cooperating teachers and teacher candidates will change from time to time throughout the preservice teaching experience (Roberts et al, 2006). Even though no significance was found in between universities on teaching efficacy when the cooperating teacher uses the communication tool, it should be noted that the overall relationship with the teacher candidate has the possibility to effect the teacher candidates' willingness to teach agriculture after graduation.

Recommendation

Reciprocal determinism is used in the study to examine the cyclical nature of the student teaching experience (behavior), age, gender, teaching efficacy(personal factors), and relationship between cooperating teacher and teacher candidate (environment). Because the experience of student teaching is so determining towards how preservice teachers value their abilities (efficacy), understanding the communication that occurs from and to them is imperative. Although the tool used in this study (and previous) did not find significant differences, the data does tell us that there is an effect occurring but not at a significant magnitude. It is firmly believed that without evaluation and it being specific, learners do understand what they know and not know. It is recommended that all cooperating teachers and student teachers gain competency in communicating about aspects of the student teaching experience.

Communication occurs daily in our professional and personal lives. The impact of communication can add value or detract from learning. Degree programs are designed to teach skills towards teaching and agriculture but there is not normally a parameter for cooperating teachers to frame their leadership towards student teachers. Although this communication tool does not significantly affect efficacy, perceptions or the view of the relationship; communication and experiences shape individuals abilities. It is recommended that based on students and cooperating teachers that all universities with teacher education degrees in agricultural education

determine how to best implement a formal process for cooperating/student teacher communication. It is further recommended that all aspects needed by professional educators be framed through this communication thus ensuing learning towards all aspects needed by professionals. University faculty should determine if a new form of communication should be reviewed and evaluated that more aligns with today's students and their immersion in technology.

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The Evaluation of Critical Thinking Dispositions in High School Agriculture Teachers

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Research Area: Teacher Education and School-based Agricultural Education

The Evaluation of Critical Thinking Dispositions in High School Agriculture Teachers

Abstract

Teachers are continually asked to develop students who are critical thinkers. Gaining an understanding of critical thinking and the capacity to think critically is essential for educators in agriculture. While critical thinking of secondary and postsecondary students has been widely studied, there is limited research that examines teachers' critical thinking and its influence on students' critical thinking. The purpose of this study was to develop a critical thinking disposition profile of high school agriculture teachers in Tennessee, and examine their Engagement, Cognitive Maturity, and Innovativeness (EMI). In further pursuit of the following the conceptual model, agriculture teachers' demographic information was collected to determine if relationships existed between age, gender, level of education, years of teaching experience, route to certification/licensure, and critical thinking dispositions. The results revealed that majority of the teachers had moderate critical thinking dispositions, and that no substantial relationships existed between critical thinking dispositions and independent demographic variables investigated.

Introduction/Conceptual Framework

For agricultural education, the National Research Agenda (NRA) emphasizes the need for a sufficient scientific and professional workforce that addresses the challenges of the 21st Century (Roberts, Harder, & Brashears, 2016). Challenges such as food safety and insecurity, climate change and water limits, appropriate technology adoption, and keeping agricultural education relevant require one being able to analyze, reason, be open-minded, and innovative. As the world's population will reach 8.5 billion by 2050 (UN, Department of Economic and Social Affairs, 2015), agriculturists, more than ever, are being expected to meet the increasing need for food, fiber and shelter while maintaining appropriate quality, quantity and availability of resources (Roberts, et al., 2016; Burbach, Matkin, Quinn, & Seale, 2012). To meet these needs and others, students, teachers, and general members of society must become critical thinkers.

Educators have been encouraged to focus on enabling their students to think critically for many years (Shaughnessy & Seevers, 2002). Through state standards and national goals, critical thinking objectives span the education field from elementary schools to universities (Crane, 2003; Soule, 2006). Agricultural education is not excluded from these mandates. Therefore, agriculture instructors need to provide students with opportunities to practice critical thinking skills and develop critical thinking dispositions (Burbach, et al., 2012).

Agriculture teachers are in position to teach relevant, integrative lessons that increase students' critical thinking development. Even though teachers have numerous opportunities to teach critical thinking, they are not necessarily developing students who are critical thinkers (Pithers, 2000). Could the problem be that educators have trouble teaching critical thinking because they are not naturally inclined to think critically themselves?

In this study, we attempt to develop a critical thinking disposition profile of teachers to determine whether they are naturally inclined to demonstrate critical thinking. A report of this type contributes to current knowledge of teaching and learning for critical thinking in significant ways. The report establishes a true baseline of critical thinking dispositions among agricultural educators. From this baseline, we can improve scholarly pursuits seeking to determine the impact of covariates like teacher preparation, leadership education, or professional development.

Critical thinkers are in demand, whether students are entering the workforce or continuing in their education (McMillan, 1987; Robinson, Garton, & Vaughn, 2007). This is especially the case for agriculture graduates starting their careers. Employers of college graduates in agriculture, natural resources, and related careers increasingly search for and vet applicants who are critical thinkers and problem solvers (i.e. Crawford, Lang, Fink, Dalton, & Fielitz, 2011; Robinson, et al., 2007; Stauffer & McMullin, 2009).

This study asked, “What are the critical thinking disposition scores of high school agriculture teachers in Tennessee,” and “Are there relationships between age, gender, level of education, years of teaching experience, and route to certification/licensure and teachers’ critical thinking dispositions?” These are important questions, because agriculture teachers, unlike other disciplinary educators, spend a great deal of time with their students through the various phases of a total program of agricultural education – classroom and laboratory learning, Future Farmers of America (FFA) activities, and Supervised Agricultural Experience (SAE) (Phipps & Osborne, 1988). Park and Rudd (2005) determined that secondary agriscience teachers influence their students through teacher actions, comments, and instruction in each of the aforementioned environments. However, are teachers conscious of the critical thinking they model for their students? Results from this study will help teachers understand their own critical thinking behaviors. How can teachers be expected to develop critical thinking in their students if they are unaware of their own dispositions in this area?

This study also assessed whether there is a relationship between critical thinking dispositions of agriculture educators and their age, gender, level of education, years of teaching experience, and route to certification/licensure that can assist with-encouraging and preparing future teachers in critical thinking development. This information has been compiled with the hope that such knowledge will guide research and professional development in the context of critical thinking dispositions of agriculture teachers.

Figure 1 provides a framework, as theorized by Perkins, Jay & Tishman (1993), for developing good critical thinking. This study equates dispositions and inclinations. Perkins, et al. (1993) found that teachers model thinking behaviors that are consistent with their dispositions, and that students are influenced by their teachers’ weak or strong thinking dispositions. If a teacher has a weak critical thinking disposition, their students risk learning undesirable critical thinking behaviors. Contrarily, if a teacher has a strong critical thinking disposition, students are more readily able to learn, especially through enculturation.

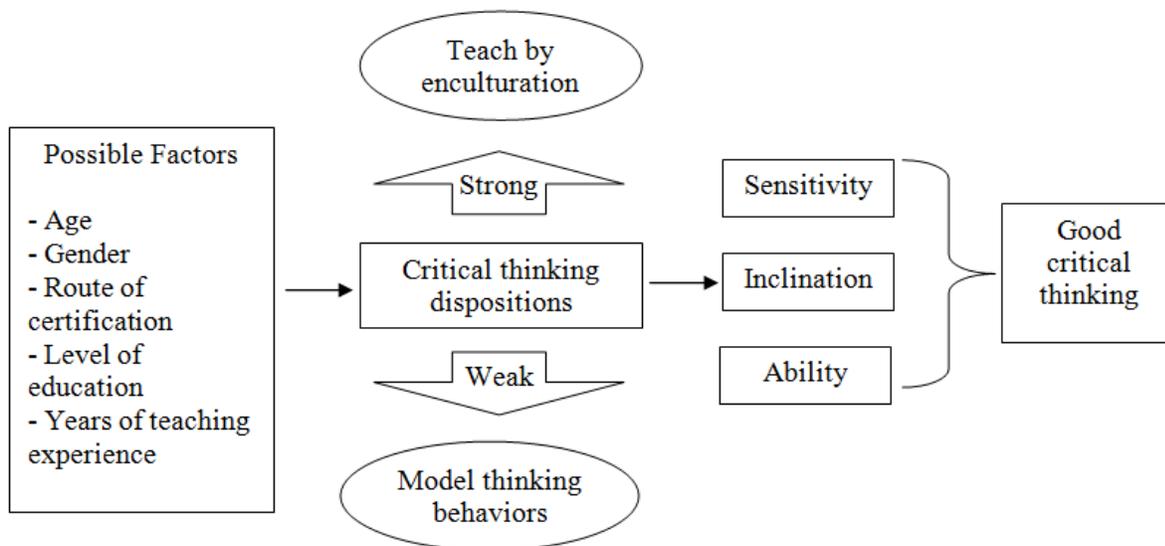


Figure 1. Conceptual model of factors affecting good critical thinking (Tishman, Jay, & Perkins, 1993).

This study relied on the Triadic Dispositional Theory offered by Perkins, Jay, and Tishman (1993) indicating that an individual should notice when a situation calls for critical thinking skills, know which skills to use, and possess the ability to use those skills. The theory states that to be an effective critical thinker an individual must be *sensitive* to situations calling for critical thought, have the *ability* to think critically, and be *inclined* to use the critical thinking skills they possess. Other researchers affirm that critical thinking *skills* are just as important as *disposition* - inclination, or willingness - to use those skills (Dewey, 1930; Ennis, 1996; Facione & Facione, 1992; Nieto & Saiz, 2011). Additionally, Perkins, et al. provide a model of enculturation which states that the most effective way to teach critical thinking dispositions is for teachers to demonstrate positive critical thinking habits, provide examples, and create teacher-student interactions involving the disposition (Tishman, et al., 1993).

Perkins used cognitive science to understand, teach, and assess thinking dispositions (Perkins, et al., 1993). They proposed that a triad of dispositions lead to behaviors. The researchers declared that good thinking dispositions consist of seven intellectual tendencies which need to be cultivated by educators: 1-broad and adventurous; 2-intellectual curiosity; 3-clarifying and seeking understanding; 4-being planful and strategic; 5- begin intellectually careful; 6-seeking and evaluating reasons; and 7-being metacognitively inclined. The authors did not disregard the idea that other dispositional characteristics play a role in good thinking; however, they found that these are the central dispositions (Tishman, et al., 1993).

The behavioral tendencies outlined by the Tishman, et al.'s (1993) triadic model align with the California Critical Thinking Disposition Inventory (CCTDI), which was the genesis of the EMI instrument too (Ricketts, 2003). According to Ricketts (2003), researchers from the University of Florida performed a factor analysis on the CCTDI and discovered that it did not accurately measure the intended constructs. As a result, a team of researchers from UF created the EMI, which used Facione's 1990 Delphi study and a literature review, to identify three dispositions necessary to determine whether an individual had a high or low critical thinking

disposition (Ricketts, 2003). These three dispositions included: engagement, cognitive maturity, and innovativeness.

Individuals strong in the *engagement* disposition are able to tell when good reasoning is needed, can look for times when the need to reason arises, and are confident in their ability to reason, solve problems, and make decisions. Those strong in the *cognitive maturity* disposition are cognizant of the idea that the beliefs held, opinions formed, and positions taken are influenced by personal upbringings, surroundings, and experiences. Individuals with a high disposition in cognitive maturity are also aware of their personal biases and realize their ideals may not hold true for others. Their open-mindedness allows them to be objective, and to consider others' points of view when making decisions and solving problems. People with the *innovativeness* disposition long for new knowledge and actively try to fulfill that longing. Individuals with a high disposition in innovativeness desire to know more about the world, their careers, the people around them, and themselves. They are intellectually curious and seek to fulfill that curiosity through research, questioning, reading, and daily interactions.

According to Perkins, et al. (1993), if teachers are to teach dispositions to students, they should utilize an enculturation model of teaching that develops positive critical thinking dispositions by focusing on exemplars, interactions, and direct instruction. Consider an agriculture teacher attempting to promote students' intellectual curiosity. To develop the students' ability to be intellectually curious, the teacher has to directly teach thinking skills that will allow students to make observations, challenge assumptions, and investigate questions. Teaching students the basic scientific method could satisfy the requirement of developing their ability to be intellectually curious. However, in addition to the ability, the student must be sensitive to situations that would require intellectual curiosity. The teacher would then aim to make students alert to unasked questions and compensate for gaps in knowledge. The teacher would model his or her personal sensitivities by stating aloud their own thought processes, such as, "I don't feel like enough information is presented here. What else do I need to know?" Finally, the teacher will cultivate the students' inclination to be intellectually curious by encouraging and rewarding indicative behaviors in the classroom.

Tishman et al. (1993) suggests that the importance of teaching, as a form of transmission, be maintained while teaching through enculturation. The authors stress that the effectiveness of different models is dependent upon the educational outcome. For instance, when a teacher's goal is to teach students how to identify different plant species, this can be achieved using a model of transmission. By using text, pictures, live specimens, and providing students the opportunity to practice, teacher's can effectively "prepare and transmit information to their learners," who will "receive, store and act upon this information" (p.149). The transmission model is effective for retrieving facts and following procedures, which tailors best to one's teaching abilities. However, the model fails to teach "commitment to principles and conducts (inclination) and alertness to appropriate occasions for their deployment (sensitivity)" (p. 149). If the teacher's goal is to foster a specific disposition in their students, then a different approach is required. Teachers must encourage sensitivities to critical thinking dispositions because a student simply knowing how to use a skill will not make them aware of when to apply the skill (Ernst & Monroe, 2004). For each disposition a teacher wants to enculturate, they should provide

examples of the disposition, encourage and orchestrate student-student and teacher-student interactions involving the disposition, and directly teach the disposition.

Other researchers support the benefit of use of the enculturation model. McBride and Knight stated, “Teachers must consciously plan and structure both their teaching behaviors and their environment for critical thinking,” by providing opportunities for inquiry, promoting cooperation and group work among students, and modeling critical thinking dispositions (1993, p. 377). Facione, Facione, and Giancarlo offered, “one powerful tool for nurturing the disposition [critical thinking] in students...is by modeling it” (2000, p. 81). According to Esterle and Clurman (1993), the primary deficit in teachers attempting to teach critical thinking is their failure to model it. Facione (2000) posed the question, “If we are not truth-seeking, open-minded, and the rest [all critical thinking dispositions], in our thinking with students...is it not unreasonable of us to expect more of them (p.35)?” The Delphi study conducted by Facione (1990), suggested that teachers should model appropriate critical thinking skills and dispositions, justify why critical thinking is important, and teach students the specific skills, along with when and how to use them. Facione, et al. (1995) contributed that as part of modeling and teaching critical thinking, teachers should admit their own biases and encourage students to become aware of the viewpoints they possess.

The primary purpose was to develop a critical thinking disposition profile for agricultural educators, linking participants’ EMI (engagement, cognitive maturity, and innovativeness) dispositions and demographic factors addressed in the literature. However, as this was one of the first studies seeking to identify the critical thinking of teachers rather than students of higher education, it was important to investigate all the variables the literature suggested might be related.

Age

In 1991, Kennedy, Fisher, and Ennis surveyed the research literature and concluded that critical thinking appears to improve with age. Since Facione, Facione, & Giancarlo (1997) theorized that, as an individual gets older, they would have higher critical thinking dispositions than a younger person; age has been a frequently investigated variable related to critical thinking dispositions. In Facione and Facione’s (1992) study of 826 students, a positive correlation between age and critical thinking disposition resulted. Wangensteen, Johansson, Bjorkstrom and Nordstrom (2010) and Kelly (2003) also found that older individuals were more likely to be critical thinkers.

The age factor needs more clarification, however, because some researchers have found that age, as a predictor of critical thinking dispositions, had no relationships to critical thinking (Facione 1990; Jenkins, 1998; Ricketts, 2003; Rodriquez, 2000; Rudd, Baker, & Hoover, 2000). Because of these discrepancies and again, limited studies related to teachers and critical thinking, the age piece of Tishman’s, et al., (1993) model of factors contributing to good critical thinking was included as part of this study.

Gender

In a study using the UF-EMI, Merrikhi (2011) found that males achieved higher critical thinking disposition scores than females; yet, many studies have reported a lack of differences

between genders when considering total critical thinking disposition scores. In a similar study, using the UF-EMI to quantify the critical thinking dispositions of meat evaluation students, no statistical differences were found relating gender to critical thinking disposition scores (Miller, et al., 2011). Cohen (2010) also reported no statistically significant differences between gender and critical thinking dispositions. Chan, Ho, and Ku (2011) found that gender was not a predictor of thinking behaviors in their study of undergraduate students' critical thinking behaviors, and Bisdorf-Rhoades, Ricketts, Irani, Lundy, & Telg (2005) failed to find a significant difference between males and females in terms of their critical thinking dispositions.

As with age, there are contradictions, concerning the influence of gender in critical thinking disposition, as the literature also sometimes indicates that gender can be predictive of critical thinking disposition scores (Hofreiter, 2005). Although no studies were found suggesting an overall higher critical thinking disposition score for a specific gender, there have been studies which report a statistically significant higher scores for males than females in the CCTDI subscale of analysis (Facione, et al., 1995; Giancarlo & Facione 2001; Wangensteen, et al., 2010). It is also commonly reported that females have higher dispositions, particularly with regards to cognitive maturity (Facione, et al., 1997; Facione, Sanchez, Facione, & Gainen, 1995; Giancarlo & Facione, 2001; Rudd, et al., 2000; Walsh & Hardy, 1999).

Level of Education

Additionally, literature on the correlation between the level of education and thinking disposition of students is conflicting. Begbie (2007) and Bisdorf-Rhoades, et al. (2005) found no difference based on level of education, but Wangensteen, et al. (2010) and Yingshan & Ying (2011) examined prior education, and they discovered that university-educated participants scored higher on total critical thinking dispositions than those who had not earned a college degree. Although no studies were found that specifically examined the level of education of teachers in terms of critical thinking disposition, Kelly (2003) came close with an investigation of the critical thinking dispositions of pre-service teachers, determining that undergraduate students had lower critical thinking dispositions than graduate students. However, Bisdorf-Rhoades, et al. (2005) concluded their study by calling for future researchers to explore the influence of gender and level of education on critical thinking dispositions.

Years of Teaching Experience

After an extensive review of literature, very limited studies were found that focused on teaching experience as related to critical thinking dispositions. For instance, in similar studies in nursing, an association between critical thinking dispositions and years of experience in certain nursing jobs was found (Feng, Chen, Chen & Pai, 2010; Huang & Yeh, 2010). In McEwen's (1994) study of business teachers, the conclusion was made that teachers, regardless of the years of teaching experience, are capable of encouraging critical thinking in students. However, as researchers have already determined, the ability to do so in contrast to the willingness to do so, are not the same. This study of the critical thinking dispositions of high school agriculture teachers, examines whether the number of years of teaching experience is an indicator of the willingness a teacher possesses to use the critical thinking skills they have.

Route to Certification/Licensure

According to Roberts and Dyer (2004), a traditionally certified teacher is one who earned an undergraduate degree in agricultural education, thereby qualifying for certification. An alternatively certified teacher is one who earned their certification by other means and applied directly for certification. Unexpectedly, Roberts and Dyer (2004) discovered that certified teachers indicated a greater need than the alternatively certified teachers for instruction in students' critical thinking development.

Purpose and Objectives

The literature review identified little understanding of the factors that may or may not contribute to this study's purpose to develop a critical thinking disposition (EMI) profile for agriculture educators. In fact, no studies looking at the critical thinking dispositions of agriculture teachers were identified. The following research questions were developed to guide this study:

1. What are the critical thinking disposition scores (CTDS) of high school agriculture teachers in Tennessee, as measured by the UF-EMI?
2. What was the high school agriculture teachers' age, gender, level of education, years of teaching experience, and route to certification/licensure?
3. Do relationships exist between the critical thinking disposition scores and demographic variables?

Methods

To limit costs and to collect data as efficiently as possible, a random sample ($n = 252$) out of a population frame of $N=339$ agriculture teachers in Tennessee was selected. The sample was selected based on the conventions of Krejcie and Morgan (1970). The design was descriptive and correlational survey research. Following approval from the university's Institutional Review Board (IRB), instruments were administered using the Tailored Design Method (Dillman, Smyth, & Christian, 2014). After initial contact, the use of inaccurate email addresses and teachers choosing to opt out resulted in a final 249 teachers being emailed a link to the survey. A response rate of 70% ($n = 175$) was achieved. Inferential statistics [independent samples t-tests, one-way Analysis of Variance (ANOVA), and Pearson's product moment correlation procedures] were used to analyze the data.

Survey Instrument

We administered the UF-EMI to analyze critical thinking dispositions. The EMI utilizes a 5-point Likert-type summated rating scale, ranging from 1 (strongly disagree) to 5 (strongly agree) (Irani, et al., 2007). The 26 items on the questionnaire represent three different constructs. The Maturity construct consist of eight items, Engagement is made up of 11 items, and Innovativeness is a six-item construct. EMI scores were calculated by adding the point value for each answer per construct. The total possible score for Engagement ranged from 11 to 55, for Cognitive Maturity it ranged from 8 to 40, and for Innovativeness the score ranged from 7 to 35. The total EMI score ranged from 26 to 130. Instrument developers at UF reported a Cronbach's alpha coefficient of $\alpha = 0.94$ for the whole instrument (Irani, et al., 2007). For each individual

construct, the coefficients as reported by Irani, et al. were Engagement, $\alpha = 0.91$; Cognitive maturity, $\alpha = 0.79$; and Innovativeness, $\alpha = 0.80$.

Our research team here at [university] developed the demographic section to collect age, gender, level of education, years of teaching experience, and route to certification/licensure data. The levels of education included the following six categories: less than a high school degree, high school degree or equivalent (e.g. GED), some college but no degree, associate’s degree, bachelor’s degree and graduate’s degree. The gender and route to certification/licensure variables were bivariate: male or female, and traditionally or alternatively certified, respectively. For number of years teaching and age, teachers simply wrote in their response.

Frequencies, means and standard deviations were calculated for overall critical thinking dispositions and for each construct. Means were compared and correlated with demographic variables using inferential statistics using SPSS (Independent samples *t*-test, Analysis of Variance, Pearson’s *r*). Data was reported using descriptive and inferential statistics including frequencies, means, independent samples *t*-tests and analysis of variance. An analysis of variance also determined there were no statistically significant differences between early and late respondents as a way of addressing non-response.

Results

Description of the Critical Thinking Dispositions of Agriculture Teachers

Scores for each construct cannot be directly compared because each construct has a different number of items. Therefore, to determine which construct teachers scored highest, percentage of possible points for each subscale is reported (See Table 1). Teachers scored about the same for Engagement and Innovativeness. Cognitive Maturity was slightly lower.

Table 1
Critical Thinking Disposition Scores of Agriculture Teachers

	<i>f</i>	<i>M</i>	<i>SD</i>	<i>%</i>
Engagement	175	43.21	4.12	78.56
Innovativeness	175	27.48	3.42	78.51
Cognitive maturity	175	30.45	3.48	76.13
Total critical thinking disposition	175	101.14*	9.15	77.80

Note: *Teachers in this study would be considered moderate critical thinkers.

For the total critical thinking disposition scale, a score of 106.7 and above indicates a strong critical thinking disposition; 85.9 to 106.6 indicates a moderate disposition; and 85.8 and below indicates a weak disposition (Bisdorf-Rhoades, et al., 2005). Seventy-four percent ($n = 130$) of high school agricultural education teachers in this study could be classified as moderate critical thinkers with a score of 101.14 for overall critical thinking disposition (See Table 2). Twenty-two percent of teachers ($n = 39$) were strong critical thinkers overall, and 3.4% ($n = 6$) were categorized as weak critical thinkers.

Agriculture Teachers’ Demographic Variables

Table 2 provides Agriculture teachers' demographic variables.

Age. Agricultural education teachers' ages ranged from 22 to 66 years old. The average age was $M = 40$ years old ($SD = 11.8$). There were 51 (29%) teachers between 31 and 40 years; 45 (26%) between the ages of 21 and 30; 37 (21%) between 41 and 50 years; 37 (21%) between 51 and 60 years; and 4 (3%) teachers were 61 years old and above.

Gender. There were 130 (75%) male respondents and 44 (25%) females.

Level of education. Ninety-five (54%) participants reported earning a graduate degree; seventy-eight (45%) reported earning a bachelor's degree as their highest degree and one (1%) reported attending college, but did not earning a degree.

Years of teaching experience. There were 79 (47%) teachers who reported 0-10 years of teaching experience; 46 (27%) with 11-20 years; 28 (17%) with 21-30 years, 14 (8%) with 31-40 years, and 1 (1%) with more than 41 years of experience.

Route to certification/licensure. Of the 175 respondents, 146 (84%) were certified traditionally through a 4-year degree program and 27 (16%) were certified through alternative methods.

Table 2
Agriculture Teachers' Demographic Information

Demographic	Item	<i>f</i>	%
Age	21-30	45	26
	31-40	51	29
	41-50	37	21
	51-60	37	21
	61 and older	4	3
Gender	Male	130	74
	Female	44	25
	Not reported	1	1
Level of Education	Bachelors	78	45
	Graduate	95	54
	Attended college w/o earning a degree	1	1
Years Teaching Experience	0-10	79	47
	11-20	46	27
	21-30	28	17
	31-40	14	8
	41 or more	1	1
Route to Certification/Licensure	Tradionally	146	84
	Alternative methods	27	16

Relationships between Critical Thinking Dispositions and Demographics

Table 3 displays Agriculture teachers' demographic variables as listed below.

Age. Pearson product moment correlation coefficients (r), exploring relationships between age and critical thinking, disposition scores were between 0.01 and 0.09 for each subscale and total EMI, indicating a negligible relationship (Miller, 1998).

Gender. Male and female teachers in this study scored very similarly, overall. Gender was not related to critical thinking dispositions, as evidenced by results of t-tests: Engagement, $t(172) = -.25, p > 0.05$, Innovativeness, $t(172) = -.56, p > 0.05$, Cognitive Maturity, $t(172) = .76, p > 0.05$, or Total EMI, $t(172) = -.04, p > 0.05$.

Level of education. Teachers scored similarly despite their level of education. One-way analysis of variances procedures determined that critical thinking dispositions were not dependent on level of education: Engagement, $F(2, 171) = .47, p > 0.05$, Cognitive Maturity, $F(2, 171) = .20, p > 0.05$, Innovativeness $F(2, 171) = .52, p > 0.05$, or Total EMI scores $F(2, 171) = .18, p > 0.05$.

Years of teaching experience. Pearson product moment correlation coefficient (r) was calculated to determine if a relationship existed between number of years teaching and critical thinking disposition scores; Pearson's r was between 0.01 and 0.09 and not significant for each subscale and total EMI, indicating no relationship (Miller, 1998).

Route to certification/licensure. Traditionally certified and alternatively certified teachers scored similarly, also. There was no critical thinking disposition difference between the two routes to certification for Engagement, $t(171) = .48, p > 0.05$, Innovativeness, $t(171) = .56, p > 0.05$, Cognitive Maturity, $t(171) = -.30, p > 0.05$, or Total EMI, $t(171) = .32, p > 0.05$.

Conclusions/Recommendations/Implications

Agriculture teachers are asked to develop critical thinking in students, but little is known about the critical thinking capacity or abilities of the teachers themselves. This study is important because agriculture teachers spend a significant amount of time with students and thus, have so many opportunities to influence them (Park & Rudd, 2005). In fact, Perkins, et al. (1993) and Tishman, et al. (2003) explained that teachers demonstrate critical thinking if they possess the discussed dispositions, and they noted that students are positively or negatively influenced by strong or weak critical thinking dispositions, respectively.

In this study, we determined that the critical thinking disposition profile of a Tennessee agriculture teacher is that of a moderate critical thinker. Tennessee agriculture teachers have room for improvement in Engagement, Innovativeness, and especially Cognitive Maturity. Since teachers model critical thinking behaviors consistent with their disposition (Tishman, et al., 2003), and since Tennessee teachers are moderate critical thinkers, it can be reasoned that when

presented with the opportunity to use critical thinking skills, or when provided an opportunity to teach the skills, they are capable of doing so.

Agriculture teachers, specifically, have moderate capacity to defend decisions they make based on logic (Engagement); they have a desire to know more about the world and seek to fulfill their curiosity (Innovativeness); and they are open-minded, aware of their personal biases, and realize that there may be multiple solutions to a problem (Maturity). Recall that to truly foster critical thinking dispositions in students, teachers must teach by enculturation (Perkins, et al., 1993) or by demonstrating critical thinking and creating a culture of critical thinking.

To teach by enculturation, teachers can provide examples of the disposition, model personal sensitivities by stating thought processes aloud, encourage and reward behaviors that indicate critical thinking dispositions, and make students alert to unasked questions and gaps in knowledge. Teachers can encourage and create student-student and teacher-student interactions involving the dispositions, and they can directly teach the dispositions.

Even though moderate dispositions indicate that the teachers are likely to use their critical thinking skills, they can only use the skills they possess. According to the conceptual model, outlined in Figure 1, teachers must be sensitive to situations calling for critical thinking and be able to apply critical thinking. This study did not examine the sensitivities or abilities of teachers, only their dispositions.

As teachers become consciously aware of their critical thinking dispositions, in efforts to model them for students to observe, it is hoped that they will develop their own dispositions over time. Therefore, the teachers who have moderate critical thinking dispositions can progress towards strong dispositions. Current teachers need to attend professional development trainings in critical thinking so that they can get their students to become problem solvers. In fact, professional development in critical thinking is an identified need area, as determined by secondary agriculture teachers themselves (Sanok, et al., 2015).

While a single study cannot provide a sound basis for encouraging changes in teaching behaviors, this study and several others have demonstrated that teachers of higher education can positively influence student's critical thinking skills, particularly when purposively and explicitly teaching critical thinking (e.g., Abrami et al., 2008; Bensley, Crowe, Bernhardt, Buckner, & Allman, 2010; Miri, Ben-Chaim, & Zoller, 2007). Based on these studies and recommendations, it is suggested that Tennessee agriculture teachers model their thinking behaviors for their students and teach by enculturation. By creating an awareness of critical thinking dispositions, teachers may begin to strive for personal improvement, thereby enhancing their ability to teach by enculturation.

None of the studied factors that impacted critical thinking in students had any influence on teachers' critical thinking development, but we recommend that future studies examine other possible factors. Does the way in which a teacher teaches impact critical thinking? Do certain topics or pathways that teachers focus on develop their capacity for critical thinking? Improving the profile is important, because we want to be able to ultimately develop students' critical thinking. Therefore, future studies should also test the enculturation theory in agricultural

education. In other words, we need to understand the impact a teacher's critical thinking has on their students, and understand how the methods they employ specifically develop critical thinking in their students.

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**Preservice Teachers' Perceptions of Infusing Mathematics in the School-
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Preservice Teachers' Perceptions of Infusing Mathematics in the School-Based Agricultural Education Curricula

Abstract

Mathematics knowledge is a critical component of natural and agricultural sciences, and school-based agricultural education is expected to support core academic instruction. Therefore, preservice agricultural education teachers must be prepared to teach mathematical concepts. This study explores preservice agricultural education teachers' perceptions of mathematics in the school-based agricultural education curricula. Five preservice teachers consisting of 4 females and 1 male participated in this qualitative study. Data were collected through individual semi-structured interviews that were approximately 30 minutes, and thematic analysis was used to analyze the data. Audit trails, triangulation, member checking, and thick description were used to achieve trustworthiness. Five themes emerged from the analysis: (a) mathematical importance in agriculture, (b) relevance to life, (c) mathematics skills required to teach school-based agricultural education, (d) lack of mathematics proficiency, and (e) lack of awareness of mathematics in the curricula. The participants recognized the importance of mathematics within the field of agriculture and daily life. However, the participants were unaware of specific mathematical concepts found within the school-based agricultural education curricula. Furthermore, participants did not possess an understanding of the common core mathematics standards. Findings from this study indicated preservice teachers are not prepared to teach mathematics concepts and need additional mathematics preparation as well as exposure to current mathematics standards they are expected to teach. Future research should investigate the means of meeting these needs through the teacher education program and in-service training.

Introduction

The emerging workforce must be prepared to adapt to a variety of situations with real-world, applicable knowledge gained through the integration of traditional subjects, such as mathematics (Association for Career and Technical Education, 2006). According to Shinn et al., (2003) mathematics education could help agriculturalists face challenges of the future.

Pressures from megatrends—including increasing world population, advancing technologies, environmental degradation, increasing socio-political migration, and global terrorism—acerbate food security and safety, as well as natural resource issues. Mathematics will play an important role in discovering and applying new solutions to global challenges (Shinn et al., 2003, p. 22).

However, the Organization for Economic Cooperation and Development's (OECD) 2012 Programme for International Student Assessment (PISA) ranks the United States student performance below average in mathematics. Specifically, the United States was ranked 27th out of 34 OECD countries surveyed (OECD, 2012). The United States' low ranking in mathematics ability could be attributed to the way mathematics is taught in the United States (Steen, 2009). Common complaints regarding the instruction of mathematics in secondary schools focus around the lack of real-world connections between math and everyday life (Steen, 2009). Abstract

figures and procedures leave little anchoring to the concrete connections students could form when taught within a context (Steen, 2009). Steen (2009) emphasized the importance of teaching mathematics in a contextual setting such as history or biology. Contextual settings allow the students to make meaningful connections to the real-world, thus increasing retention (Steen, 2009). Similarly, Moscovici and Newton (2006) stated the integration of traditional subjects, such as math, allows students to make deeper connections to real-world situations through the development of problem solving skills. According to OECD (2012), students in the United States “have particular weaknesses in items with higher cognitive demands, such as taking real-world situations, translating them into mathematical terms, and interpreting mathematical aspects in real-world problems” (p. 2).

With that in mind, agricultural education has the potential to provide real-world contexts, which are required for students to make deeper associations with mathematics (Dailey, Conroy, & Shelly-Tolbert, 2001). According to the Food and Agricultural Organizations of the United Nations (FAO) (2009), agriculture, like any sector of the global economy, is changing quickly, and as a result, changes must occur in order to meet the demands of a growing world population. Agricultural education should focus on integrating academics, such as science and mathematics, in order to prepare students to be successful in a globalized world (ACTE, 2006). The United States Department of Education also called for career and technical education programs with “integrated academic and technical content,” in their 2012 report titled *Investing in America’s Future: A Blueprint for Transforming Career and Technical Education*. Furthermore, beyond these calls for change, Perkins IV required career and technical education to integrate core academic content into programs of study (Stachler, Young, & Borr, 2013), and researchers have found the integration of mathematics concepts into school-based agricultural education courses increases mathematical understanding (Parr, Edwards, & Leising, 2006; Young, Edwards, & Leising, 2009; Stone III, Alfeld, & Pearson, 2008) without lessening students’ technical skill acquisition (Parr, Edwards, & Leising, 2008; Young, Edwards, & Leising, 2009).

However, despite the pressure from governmental reforms and evidence supporting mathematic integration in school-based agricultural education, our nation’s preservice teachers continue to lack the mathematics content knowledge to teach the mathematics found in the agricultural education curricula (Stripling & Roberts, 2012b; Stripling, Roberts, & Stephens, 2014). This study will examine this issue by seeking to understand the preservice teachers’ perceptions of the mathematics found in the school-based agricultural education curricula.

Theoretical Perspective and Framework

The theoretical perspective that served this study was constructionism. Constructionism is the theory that no meaning was ever discovered, but, as the word indicates, constructed by the environment one encounters (Crotty, 1998). Crotty simplifies his theory by stating, “before there were consciousnesses on earth capable of interpreting the world, the world held no meaning at all” (p.43). All meaning was made after there was a conscious being to construct it (Crotty, 1998). Humans must interact with their environments to construct meaning of anything (Crotty, 1998). For the context of this study, preservice agricultural educators construct their knowledge regarding mathematic concepts in agricultural education curricula based upon previous encounters, experiences and knowledge.

The theoretical framework for this study was Bandura's (1986) social cognitive theory. Bandura proposed that human behavior is influenced by (a) behavior, (b) personal factors, and (c) environment. Each factor can vary in strength and influence and interact bidirectionally and may or may not occur simultaneously (Bandura, 1986).

The interaction between personal factors and behavior highlights the idea that how a person thinks, believes, or feels can determine how they behave (Bandura, 1986). Behavior can also be shaped and restricted by personal characteristics and capabilities (Bandura, 1986). Furthermore, the environment is not a fixed entity but is shaped by personal and behavioral influences (Bandura, 1986). In addition, when the environment is influenced by specific behaviors, then a person's behavior affects the environmental climate (Bandura, 1986). Finally, behavior and environment reciprocate (Bandura, 1986). Behavior can create an environment when the environment is flexible or rigid (Bandura, 1986). Likewise, environment can influence behavior (Bandura, 1986). Therefore, for the context of this study, behavior is defined as future teaching practices, personal factors are defined as perceptions of mathematics in agricultural education, and the environment is defined by the agricultural teacher education program.

Behavior – Future Teaching Practices

Behavior, defined in this study as future teaching practices, is influenced by personal factors (as defined by perceptions of mathematics in agricultural education) as well as environment (as defined by the agricultural teacher education program). The OECD (2006) outlines that teacher roles are exceedingly variable for many reasons including the need "to keep pace with rapidly developing fields of knowledge" (p. 97), which is appropriate for this study as it highlights the integration of mathematics education into agricultural education programs.

In a large-scale investigation regarding how teachers learn to teach, the National Center for Research on Teacher Learning, found there are too many factors to implement one widespread solution (Kennedy, 1991). Future teaching methods can be influenced by (a) subject matter knowledge, (b) being taught the accommodation of diverse learners, (c) previous mentors that offered on-the-job guidance, (d) alternative certification program usage, and (e) preservice programs (Kennedy, 1991). Effective teachers are vital to the continuation of economic and social growth around the world through educating the future leaders of countries (OECD, 2006). Developing and developed countries around the world are looking for ways to improve their schools, and the most critical component is teacher development (OECD, 2006). Findings indicate that knowing how to teach (and being trained in teaching) is positively correlated with student achievement (Wenglinsky, 2002; Gustafsson, 2003; Educational Testing Service, 2000; Wayne & Youngs, 2003). In addition, personal factors such as behavior, cognition, content knowledge, character and knowledge of context and environment of their students, can largely affect the way a teacher communicates information (Shulman, 1991).

Personal Factors – Perceptions of Mathematics in Agricultural Education

Personal factors, defined in this study as perceptions of mathematics in agricultural education, is influenced by both behavior (as defined by future teaching practices) and environment (as defined by the agricultural teacher education program).

Few studies exist on the perceptions agricultural educators hold regarding mathematics in the curriculum. However, a preliminary qualitative study interviewed five exceptional agricultural educators in Virginia who had experience with integrating mathematics into their classrooms (Anderson & Anderson, 2012). From the interviews, four themes emerged, one being *mathematics as a component of agricultural education*, (Anderson & Anderson, 2012). This overarching theme gave way to multiple sub-themes: (a) agriculture as a real-world setting for mathematics, (b) issues regarding integration (c) agricultural education lessons integrated with mathematics (d) Career Development Events that utilize mathematics and (e) teacher's cognitive effort to emphasize mathematics (Anderson & Anderson, 2012).

Environment –Agricultural Teacher Education Program

FAO predicts a world population of over 9.1 billion people by 2050 (2009). Although this is not the fastest rate of growth seen (Federico, 2005; FAO, 2009), it is significant because it consists of new challenges such as limited land and labor resources and sprawling urbanization (FAO, 2009). In an effort to meet the needs of a changing world, The National Academies highlights the need to efficiently train faculty (2009). As the world changes, educators must change just as swiftly (The National Academies, 2009), and the environments in which educators are trained can have a large effect on a teacher's ability to teach mathematical concepts.

Environment, defined in the context of this study as the agricultural teacher education program, is influenced by both behavior (as defined by future teaching practices) and personal factors (as defined by perceptions of mathematics in agricultural education). According to Birkenholz and Simonsen (2011), distinguished agricultural education programs were successful due to the faculty members they hired, research programs, and the range of programs. Therefore, it becomes important to populate our agricultural education programs with quality educators and the ability to teach the course material being requested. However, what are the perceptions of infusing mathematics into the agricultural education curricula by preservice agricultural education teachers?

Purpose

The purpose of this study was to explore preservice agricultural education teachers' perceptions of mathematics in the school-based agricultural education curricula. The central research question guiding this study was, "What are preservice teachers' perceptions of infusing mathematics in the school-based agricultural education curricula?"

Methods

According to Creswell (2013), qualitative research provides the researcher the opportunity to holistically analyze and interpret the participants experience and thoughts to explain the participant's position on the research question being discussed. Merriam's (2002) basic interpretive approach was used for this study because it allowed the researcher to interpret "how participants make meaning of a situation or phenomenon" (p.3).

Research Participants

Participants were purposively selected based on the following criterion: participants must be a preservice agriculture teacher at Tennessee Tech University completing their final year of course work prior to student teaching. Five potential participants were identified and asked to participate in the study, because they were the only five preservice agriculture teachers in their final year of the program at Tennessee Tech University. Four females and one male voluntarily participated in the study and were labeled S1, S2, S3, S4, and S5. After graduation, all five participants planned on receiving a teaching license in Tennessee as a high school agricultural education teacher. Prior to attending college, four of the five participants were involved as a student in an agricultural education program and held prior knowledge of agricultural course offerings in Tennessee.

Data Collection and Data Analysis

To capture the conversation between the participant and the researcher, individual interviews were used as the primary data collection method (Creswell, 2013), and we also took notes during the interviews to use as data. Additionally, participants were given the opportunity to answer the same questions in writing but all five agreed to a face-to-face interview. Face-to-face interviews were conducted over a one-week time period at Tennessee Tech University. Each interview lasted approximately 30 minutes, was facilitated by the lead researchers, and was audio recorded and then transcribed. A semi-structured interview protocol was developed by the researchers.

After the interviews were conducted, researchers read through the raw data three times and then individually coded the data. Thematic analysis was used because it allowed for reoccurring words and phrases to be identified (Grbich, 2007). More specifically, researchers manually color coded the data, which allowed for themes to emerge (Grbich, 2007). Grbich (2007) refers to the color coding method as the block and file approach. The codes were then categorized and titles were created for each of the themes that emerged from the data. Additionally, the findings of this study are intended to be transferable to situations and groups which are similar to the group examined in this study (Lincoln & Guba, 1985; Merriam, 2009). However, the small sample size is a limitation and care should be taken when transferring the finding to another group of preservice agricultural educators.

Trustworthiness

Attention to qualitative methodology helps a reader determine whether or not the findings are transferable to another group of individuals (Dooley, 2007). According to Lincoln and Guba (1985) the trustworthiness of qualitative research may be achieved by incorporating specific strategies into the research in order to address credibility, transferability, dependability, and confirmability.

Credibility

Credibility was achieved through triangulation, referential adequacy materials, peer debriefing, and member checking (Erlandson, Harris, Skipper, & Allen, 1993; Lincoln & Guba, 1985). Triangulation took place when the data was analyzed by multiple researchers and two data collection methods were used. Verbal member checking throughout each interview allowed the researcher to ensure participants response was captured accurately. Peer debriefing allowed the researchers to discuss the research with knowledgeable individuals in the field of qualitative

research, but who were not part of the study (Erlandson, Harris, Skipper, & Allen, 1993; Lincoln & Guba, 1985).

Transferability

Transferability was addressed by providing detailed descriptions of the findings and of the participants. The participants were purposively selected based on their enrollment in an agricultural education preservice teacher program and their goal of becoming an agriculture teacher. Direct quotes and paraphrasing from the interview data were used to provide thick description.

Dependability and Confirmability

During data analysis, an audit trail was used to help ensure dependability. The audit trail allowed for methodological decisions to be recorded on paper and used as a dependability audit (Dooley, 2007). Decisions regarding why data was separated into a particular theme were also recorded in order to achieve confirmability and provide a confirmability audit.

Subjectivity Statement

There often can and will be bias in qualitative research. However, addressing those individual biases prior to research is important. The researchers involved with this project have experience teaching agricultural education and infusing mathematical concepts into the agricultural education curriculum. The researchers believe that mathematics is a natural component of agriculture. In an effort to control the biases, all researchers were involved in the questionnaire development, interviewing process, and thematic analysis.

Findings

Five themes emerged from the analysis: (a) mathematical importance in agriculture, (b) relevance to life, (c) mathematics skills required to teach school-based agricultural education, (d) lack of mathematics proficiency, and (e) lack of awareness of mathematics in the curricula.

Mathematical Importance in Agriculture

The participants recognized the importance of mathematics within the field of agriculture. Participants recognized agricultural education teachers have been teaching math, because to be able to be successful in teaching agriculture one must be able to incorporate math into the curriculum (S1; S2; S3; S5). S1 stated, "I know that in every subject there is math that has to be taught whether it's in agriscience or in greenhouse." Therefore, "pretty much any ag ed class you have you are going to use math in it" (S1). Furthermore, S3 stated, "but all along we have been teaching math, because to be able to be successful in agriculture you have to do math...I think that math is really important in ag and that I value the education that I received from my ag department in high school." Additionally, S2 declared, "the only thing that I really know about it is that math is an integral part of the science that we teach." Referring to mathematical importance in agriculture, S5 stated, "well because math is ag."

Participants also noted mathematics to be a critical component of agriculture in the area of feed rationing. S1 stated, "you will be rationing feed and that uses mathematics." While S3 declared "I mean when you do feed rations you have to subtract and divide and multiply and do

all those.” Additionally, teaching mechanics, specifically horsepower, was mentioned by participant S1 twice. S1 stated, “horsepower and stuff like that relates to mechanics...like when you’re doing the horsepower you’re basically just multiplying and dividing and stuff like that.”

The importance of fertilization and calculations was also mentioned. S1 stated, “you have to use it for the fertilizers and stuff like that.” Additionally, S4 added “certainly like with plant science you would learn how to do fertilizer calculations and with animal science you deal with ratios dealing with genetics such as the Punnett square and with agricultural engineering aspect you could deal with how many square acres of fertilizer you need or how to calibrate a machine to work efficiently. Furthermore, participants agreed educators must distribute the math teaching throughout the curriculum (S4; S5). Participant S5 stated, “you kind of space it [math] out throughout the year in different scenarios where it applies.” Participant S4 stated, “you don’t want to talk about land measuring or how to draft or cutting at the same time...those don’t really apply so you don’t want to do all the math at once, you kind of want to space it out” (S4).

Relevance to Life

The participants recognized the relevance of mathematics in daily life. Two things were found in the participants’ beliefs about the mathematics: (a) the need to understand math to get through everyday life and (b) the need to demonstrate math concepts to be successful. Referring to the need to understand math to get through everyday life, participant S1 stated, “you can’t get through life without knowing it [math]” and “you see it being done in real-world experiences that you are going to be using later on.” Additionally, S4 stated, “math is a subject that you take with you no matter what you plan on majoring in or doing with your life. It’s constant use.” Furthermore, in agriculture, you have the opportunity to apply math to real-world situations (S1; S2; S4).

Pertaining to the need to know math to be successful, participants S1 and S4 believed it was impossible to get through life without understanding math. Participants also believed math had some sort of relevance to life (S1; S3; S4; S5). While participants S2 and S3 stated, “you cannot run a successful farming operation if you do not know how to do math.” Additionally, participants related math to being successful agriculturists.

I mean if you have a crop and you have to go put fertilizer on it. You have to know how to read the bags and after you read the bags, you have to know the math of if it has 50/30/20, you have to know then that there is .05 nitrogen in it, and you have to calculate that out to see how many actual pounds of that fertilizer you need to put on it (S1).

While S2 stated, “because you could simply lose a crop if you do not know how to apply fertilizer correctly.” Additionally, participants gave examples of what should be taught in regard to relevance to life. S4 stated, “I think that a teacher should use more worldly examples so students know exactly why they are learning this material and why they need it” (S4). Furthermore, participant S3 stated,

we should teach how to do graphs and how to read graphs in your algebra class, because it really helps. Because in agriculture, no matter what the discipline, there is different

graphs that you have to be able to read whether it's a bar graph or a line graph, so that helps.

Mathematics Skills Required to Teach School-Based Agricultural Education

Five factors related to mathematics skills required to teach school-based agricultural education: (a) basic math, (b) algebra, (c) geometry, (d) critically thinking, and (e) statistics (S1; S2; S3; S4; S5). Participants noted knowing basic math was required. "You need to know adding, subtracting which hopefully by high school they even know multiplication and division" (S1). Also, S4 felt, "you would need to know your basic math skills." S1 stated, "it's basic and you just need to know the basic stuff". S2 indicated "they[students] are going to have to know the system of where you usually go and you do the parenthesis and then you divide and multiply and then you add and subtract."

S1 stated, "I would say more algebra, definitely geometry." While S3 also stated "I think you need a firm foundation on algebra, but also geometry and even some form of statistics." Additionally, S5 stated "going to need a little bit of algebra but probably not as much as you would the geometry type stuff." Also, participant S3 stated,

I mean measuring that's algebra and even geometry, but like in your mechanic's class you use math a lot because of like in making the rafters you have to know the geometry and the area and all this physics stuff too, how much weight it can hold and geometry, pre-algebra, and algebra that would help."

Furthermore, S5 stated, "I think like basic algebra, basic geometry like you don't want to not have any understanding about those, because when you get in like you do a lot of angles in ag you do a lot of measurements." Participant S5 went as far to say "I think geometry is the most important."

Participants S4 and S5 felt students need to know how to use math to think critically and solve problems in agriculture. Agricultural education is not just knowing how to use equations, it requires students to break information a part and solve real problems using math (S4; S5). S5 stated, "I think you need to take more critical thinking math." While S3 and S4 mentioned some form of "statistics."

Lack of Mathematics Proficiency

Some participants displayed a lack of mathematics proficiency. S1 stated, "I've never taken a pre-cal class, so I don't know what all goes on in pre-cal." As indicated by S4,

I have problems with math. I am very weak in math. I am one of those people that rely on a calculator to do math, and it is going to be very difficult to teach students math and expect them not to use one. So, I have to reteach myself in order to expect the same out of them."

In addition, S1 discussed being in a small animal care and not being taught mathematical concepts.

I know when I was in small animal care we never talked really that much about how it was math and stuff. So, I guess the ag ed teachers need to just speak up more about the fact that they are doing math and relate it back because most of the time they don't know.

Furthermore, S5 commented, "I do feel like some of them [agriculture teachers] just skip over it [teaching mathematics]. Overall, participants discussed several areas of where they lacked mathematical proficiency because mathematics was not taught or emphasized in their agricultural education curriculum.

Lack of Awareness of Mathematics in the Curricula

Some participants did not possess an understanding of the common core mathematic standards. Participant S1 stated, "I don't know of any specific standard" and participant S5 stated "I couldn't tell you." Correspondingly, participant S5 stated, "as far as specific concepts go, don't really know any specific concepts." Statements like these were a common theme for all participants throughout the interview (S1; S2; S3; S4; S5).

"Honestly I do not know very much about the Tennessee mathematics standards" (S4). Additionally, participant S3 stated, "I honestly have not looked at just the regular Tennessee Mathematic standards, because we have been so focused on what core is in Tennessee. But, I do know that a lot of the Tennessee standards do match with the agriculture standards." Both participants were unfamiliar with Tennessee standards.

Conclusions and Discussion

Five themes emerged from the analysis: (a) mathematical importance in agriculture, (b) relevance to life, (c) mathematics skills required to teach school-based agricultural education, (d) lack of mathematics proficiency, and (e) lack of awareness of mathematics in the curricula. Participants recognized the importance of mathematics within the field of agriculture, with a majority of participants indicating that to be successful in agriculture you must incorporate mathematics into agricultural education classes. This concept aligns with the Association of Career and Technical Education (2006) assertion that agricultural education must stay true to its interdisciplinary nature, which allows for mathematics integration. In addition, participants stated agricultural education teachers taught some form of math in their agriculture courses, which supports Parr et al. (2008) confirmation of the value of teaching mathematics through and agricultural context. Furthermore, Dailey (2001) postulated that agricultural education has the potential to provide the concrete contexts required for students to make deeper associations with mathematics and the natural sciences, which appear to be lacking in the traditional mathematics classroom.

The participants recognized the relevance of mathematics in daily life. Two things were found in the participants' beliefs about the mathematics and how it is relevant to life: (a) the need to understand math to get through everyday life and (b) the need to demonstrate math concepts to be successful. Participants' recognizing the relevance of mathematics to daily life directly corresponds to Bandura's (1986) social cognitive theory, which proposed that learning is a lifelong developmental process influenced by (a) behavior, (b) personal factors, and (c) environment. Additionally, participants believed that the ability to perform mathematical

calculations is a skill that students retain and can use throughout their life. According to Bandura (1986), behavior can be shaped and restricted by the personal characteristics and capabilities. However, according to Steen (2009) common complaints regarding the instruction of math in secondary schools center around the lack of real-world connections made between the math and everyday life, which indicates people do not recognize the relevance of mathematics when it is in an abstract form. Steen (2009) emphasized the importance of teaching mathematics in a contextual setting such as history or biology. As noted by participants in this study, agriculture provides a real-world context that may be used to bring mathematics concepts to life. Agricultural settings allow students to deeply explore the context in which the challenge or issue is embedded and allows the student to understand how mathematics can be used to solve the challenge or issue. Developing contextually-based mathematics courses would not only align with Parr et al's (2006) recommendation, but it would also help high school students to graduate with the capability to solve real-world problems (OECD, 2012). Similarly, the focus on mathematics in an agricultural classroom aligns with Moscovici and Newton's (2006) assertion that the integration of traditional subjects allows students to make deeper connections to the real-world.

Five factors related to teaching mathematics in school-based agricultural education were identified: (a) basic math, (b) algebra, (c) geometry, (d) critically thinking, and (e) statistics. However, according to PISA (2012), the United States ranks below average in mathematics on a worldwide scale. In addition, the United States ranked 27th out of the 34 countries surveyed (OECD, 2012). Being able to use basic math, algebra, geometry, critical thinking, and statistics is critical; however, it is not enough. According to Steen (2009), American's failure in mathematics could be attributed to the way it is taught. Therefore, how can we expect school-based agricultural education teachers to be proficient in math, if the education system which produced the teachers has failed them? In agreement with Parr et al. (2008), school-based agricultural education courses need to be designed to specifically teach mathematics through the context of agriculture, which would provide the opportunity for real-world connections and increased retention (Steen, 2009).

However, some participants were unaware of specific mathematical concepts found within the school-based agricultural education curricula. This is directly linked to the following tenets of Bandura's social cognitive theory (1986); behavior, (defined in this study as future teaching practices), and is influenced by personal factors (as defined by perceptions of mathematics in agricultural education) as well as environment (as defined by the agricultural teacher education program). Explicit connections between mathematics and agriculture should be incorporated into the agricultural teacher preparation program.

To that end, Kennedy (1991) posited that there are too many factors involved in teacher preparation to implement one widespread fix. Different teaching methods and approaches should be taught in teacher preparation programs and based on state standards, in order to limit the lack of awareness of specific mathematical concepts found within the school-based agricultural education curricula. Kennedy (1991) also found the teaching methods teachers choose to use may be influenced by their understanding of the content, professional mentors, and the method in which they were certified to teach.

Furthermore, participants did not possess an understanding of the common core mathematic standards or the Tennessee mathematic standards. Findings from this study indicated preservice SBAEs are not prepared to teach mathematics concepts and need additional mathematics preparation as well as exposure to current mathematics standards they are expected to teach. This particular theme supports personal factors, which is defined in this study as perceptions of mathematics in agricultural education, is influenced by both behavior (as defined by future teaching practices) and environment (as defined the agricultural teacher education program). The assertion that preservice teachers are not prepared to teach mathematics concepts aligns with the findings from Stripling and Roberts (2012a, 2012b, 2013a, 2013b).

Recommendations

Participants recognized the importance of mathematics within the field of agriculture, but are not prepared to integrate mathematics into the high school classroom. Therefore, preservice agricultural teachers should consider enrolling in a university level applied mathematics course contextualized within agriculture. An applied mathematics course should help to prepare preservice agricultural teachers to teach mathematics in the SBAE classroom. Additionally, the creation of mathematics courses contextualized in agriculture for SBAE should be, developed and empirically tested across the United States. Further research should be conducted to evaluate both preservice and in-service agriculture teachers' mathematic abilities and their ability to effectively teach contextualized mathematics. Additionally, baseline data should be collected to determine how agriculture teachers across the United States are currently teaching mathematics.

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Needs Assessment for Prospective Hispanic Farmers and Ranchers

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Type of Research: Qualitative Research
Research Priority Area 5: Efficient and Effective Agricultural Education Programs

Needs Assessment for Prospective Hispanic Farmers and Ranchers

Abstract

The purpose of this qualitative study was to identify the needs and interests of prospective Hispanic farmers and ranchers in the target counties in order to improve outreach programs. The results will help outreach programs to mitigate the barriers identified by study participants and focus on the needs of Hispanic farmers. The methodology used was basic qualitative research using focus group interviews, observational analysis, and literature review of previous studies. Three focus group interviews with 6-14 people in each group were used for data collection. Interviews were conducted in Spanish and recorded. Comparisons were made within groups and among groups. The information was analyzed to identify patterns or trends in discussion. The categories found included family support, education, culture, communication, economic stability, immigration status, services, agriculture, fear, language, vision and opportunities, how to start and maintain a business, and community opinion leadership.

Introduction/Conceptual Framework

Hispanics are the fastest growing ethnic group in farm ownership and operations in the United States of America (García-Pabón & Lucht, 2009). There is a need to increase the services to Latino farmers and ranchers, who are contributing to the future of agriculture and support their potential role as industry leaders (Marinez & Gomez, 2011). A review of the literature available on Hispanic farmers and ranchers revealed that there are certain barriers for Hispanic farmers to start their own business in agriculture. Due to these barriers, outreach programs have difficulty reaching this part of the population to identify their needs and interests. As the U.S. becomes more diverse, extension programs must continue to expand the ability to serve people from different cultures, and the staff should be prepared to use new perspectives and new ways of doing business (Hobbs, 2004).

Texas is one of the most popular immigrant gateways to the U.S. and due to its proximity to Mexico, many of the state's immigrants are Hispanic. Texas has many advantages that attract immigrants along with U.S. natives, such as rich natural resources, abundant land, central location within the U.S., and it has a business-friendly environment. These advantages present challenges for the fast growing, young, and diverse state (Petersen & Assanie, 2005). Without changing socioeconomic conditions, Texas population could become less educated, less competitive, poorer, and in greater need of state services (Petersen & Assanie, 2005).

The agricultural sector is dependent on undocumented immigrants that conduct repetitive tasks, with no career development and low wages (Callan, 2011). Hispanics tend to have average wages 40% below of those of natives (Petersen & Assanie, 2005). However, there is evidence that Hispanics' socioeconomic status improves with time spent in the U.S. It is more likely for Hispanics to work in farming, construction, and production jobs than professional occupations. In 2000, Hispanics represented 12% of the labor force, but they made up more than 40% of workers in farming occupations (Kochhar, 2005).

Hispanics are not a homogenous group, meaning that one educational model may not be applicable to all Hispanic farmers (Lopez Ariza & Suvedi, 2009). It is a reality that most Hispanics come to the U.S in search of the "American Dream" (Garcia-Pabón & Lucht, 2009).

According to Warrix and Bocanegra (1998), it is very important to understand the Hispanic culture, values and attitudes to be able to work successfully with them. Personalism and familism are key to reach Hispanics successfully. Personalism refers to the faith in person-to-person contact (face-to-face interaction). Familism refers to the importance of the family in an individual's life. According to Romero (2004), the family is the most important vehicle for the transmission of values and beliefs among Hispanics. Due to the rapid growth of the Hispanic population in the U.S. workforce, it is important to understand the level of acculturation and how to effectively integrate them in teams, leadership positions, and other organizational roles.

Census Data

According to Passel, Cohn, and Lopez (2011) the 2010 census accounted for 50.5 million Hispanics in the U.S., which represents 16.3% of the entire population. Over a decade, from 2000 to 2010 the Hispanic population grew 43% (Passel, Cohn, & Lopez, 2011). The U.S. Census Bureau projects that the Latino population will comprise 30% of the U.S. population by 2050 (Martinez & Gardner, 2011).

According to Garcia and Marinez (2005), having an accurate Agricultural Census count is important so extension agents know the size and growth of this part of the population. Otherwise, it is hard to plan or advocate for Hispanic farmers. Possible barriers for the participation of Hispanics in the Agricultural Census are (1) missing from USDA mailing list, (2) limited or no knowledge of Agricultural Census, (3) language and illiteracy problems, (4) apprehension about the USDA, (5) immigration status, (6) name borrowers (presta nombres-family members with good credit get a loan for them, so really the owner of the farm is someone else), (7) informal farming arrangements, and (8) farmers as farmworkers. Many Hispanic farmers are losing money, have large debts, and they do not take advantage of the programs the USDA has to offer. With an accurate census, programs can be justified and developed to better serve the needs of Hispanic farmers (Garcia & Marinez, 2005). Furthermore, the USDA should also assist in basic agricultural training for Latino farmers and ranchers (Starkweather, Bailey, Preston, Jeanetta & Gonzalez, 2011).

Hispanics Role in Agriculture

Hispanics represent a potential substitute for the aging white and African American producers whose families no longer want to continue working on the family farm and prefer non-farm careers (Garcia & Marinez, 2005). Many of the American farmers are growing older and do not have another family member to take over the operation. Latino farmers represent a good opportunity for development as a new and dynamic part of the community development (Garcia-Pabón & Lucht, 2009).

According to Lopez and Suvedi (2009), Hispanics become farm owner-operators because they consider agriculture a profitable activity. Working on a farm is also part of their heritage, involves family values, allows them to be their own boss, and have a better lifestyle. Starkweather et al. (2011) reported that Latino farmers come from agricultural backgrounds, and they see farming as a desirable lifestyle with most of their knowledge learned from experience.

Cultural Barriers Faced by Hispanics

Warrix and Bocanegra (1998), identified five cultural barriers to conducting successful programs with Hispanics. These include level of education, language barriers (78% of Hispanics speak Spanish at home), poverty (23% of Hispanics families live below the poverty line), lack of understanding of the business system (marketing, tax laws, record keeping), and misunderstanding of cultural values (personalism, familism, and machismo) by program providers. Warrix and Bocanegra (1998) suggest strategies to increase participation of Hispanics in extension and USDA programs which include partnering with Hispanic institutions and community organizations to develop credibility with the clientele, translating materials, organizing focus groups with Hispanic facilitators to determine topics for future programs, utilizing bilingual staff to present training, and adhering to non-discrimination practices and procedures.

Barriers faced by Hispanics to participation in USDA programs

Hispanic farmers and ranchers are classified as socially disadvantaged individuals (SDA), which includes members who have been subject to racial or ethnic prejudice because of their identity as members of a group without regard of their individual qualities (Martinez-Feria, 2011). Hispanics appear to have the lowest participation rate of USDA programs compared to other SDA farmer and rancher groups (Garcia & Marinez, 2005; Marinez & Gomez, 2011). According to Marinez and Gomez (2011), Hispanic participation in USDA programs within one state was limited because USDA agencies had not adequately marketed their programs to Hispanics, language barriers existed, and there was difficulty understanding program eligibility and services.

Barriers faced by Hispanics to start their own farm

Barriers identified for Hispanics wanting to start, develop, and sustain farming and ranching are many. These include: limited access to land, high prices of land, limited economic resilience, limited access to machinery and equipment, limited financial literacy or access to financial resources, limited education, lack of knowledge and understanding of various government farm programs, absence of financial records, and misconception that USDA programs are only for large operations (Martinez-Feria, 2011). Latino/Hispanic farmers start their businesses with personal savings, mostly because they have a limited knowledge of USDA programs and are suspicious of the government. Limited interaction with the USDA can also be attributed to language barriers (Starkweather, Bailey, Preston, Jeanetta, & Gonzalez, 2011). Reasons identified by Latinos for quitting farming or ranching include the lack of information about USDA programs, price of land, low profits, aging, and lack of a business plan formulation (Starkweather et al., 2011).

According to Maslow's hierarchy of needs, needs are addressed in order, starting with the base of the pyramid, which looks at physiological needs. Moving up the pyramid, the needs start to become more complex and include safety needs, social needs, esteem needs, and finally self-actualization (Poston, 2009). Brown (2002) writes: "Without a clear understanding of needs, training efforts are at best randomly useful and at worst, useless. The trainer will only be successful and perceived as such to the extent that needs are carefully assessed, and programs developed and carried out that meet those needs" (p.577).

Low participation in an outreach program oriented toward beginning Hispanic farmers and ranchers developed by Texas A&M University-Commerce resulted in the need to identify current and prospective participants' needs and interests for future training. The need also existed to identify potential barriers to community acculturation and engagement by Hispanics as well as incentivizing support services.

Purpose/Research Questions

The purpose of this qualitative study was to identify the needs and interests of prospective Hispanic farmers and ranchers in East Texas in order to improve outreach programs. The study was guided by the following research questions:

- (1) What are the needs, interests, and concerns of prospective and beginning Hispanic farmers and ranchers?
- (2) What are the types and preferences of training or outreach that are relevant to prospective and beginning Hispanic farmers and ranchers?
- (3) Who are local opinion leaders among Hispanic communities?
- (4) What Hispanic family needs are relevant to current and future training and outreach?
- (5) What are the relationships of prospective Hispanic farmers and ranchers with agencies and services in the community?

This research is related to Priority 5 of the 2016-2020 National Research Agenda of American Association for Agricultural Education, which focuses on efficient and effective agricultural education programs (Roberts, Harder, & Brashears, 2016).

Methods/Procedures

Design of the Study

According to Barbour (2007), focus groups allow the researcher to generate and analyze interaction between participants. Focus groups have a unique potential to combine structure and spontaneity. The focus group method was used in this study because, according to the literature, focus groups are an excellent way of identifying the needs of under-served populations, and this method can give voice to silent immigrant groups. In addition, Malek (2001) states: a focus group is an assessment tool that provides a comfortable approach, which allows obtaining direct information from the target population. They share information without feeling compelled or driven to specific answers. The focus group is a technique in which participants are directly involved in gathering information.

It is imperative to transcribe verbatim in the language in which the interview was conducted. This is necessary to capture the richness of the participants' narrations as they give them. Qualitative researchers should ensure representation of participants' beliefs, words, and behaviors during data collection (Esposito, 2001).

The methodology used for this study was basic qualitative research using focus group interviews. Combining the analysis of focus group responses with observational analysis and a review of relevant prior studies allowed data triangulation to increase internal validity. Peer

examination by members of the research team contributed to the consistency of the study (Merriam, 2009).

Focus Group questions

Focus group questions were adapted from a prior study (Malek, 2001) which focused on Hispanic family needs that could be addressed through extension programs and other questions were developed by the research team to collect information to answer the research questions as well as provide direction for future programming with this audience that might reach beyond their interests in farming or ranching. Malek (2001) adapted prompts included:

1. What would make your life and your family’s life better?
2. Which of the ideas you shared need the most urgent attention?
3. Please suggest what you would like agencies to do differently to better assist Hispanic families. If you can, name the agency and what you would like them to do differently.
4. What do you think you and your family could do to help accomplish the suggestions you have made?
5. What would be your preferred way or your family’s preferred way of learning about the issue (s) you have mentioned?

Four additional questions were developed by the research team. Responses to these questions provided context regarding potential barriers preventing assistance and strategies that could possibly increase the number of current and prospective Hispanic farmers and ranchers in targeted counties.

6. Do you have any experience in farming/ranching?
7. Do you have your own farm? If no, would you be interested in having your own farm in the future?
8. What do you consider some of the challenges that Hispanics face when trying to establish their own farm or small business?
9. What kind of training or educational activities would interest you?

Selection of participants

The target population consisted of current and prospective Hispanic farmers and ranchers with limited resources located in various community based-settings in three counties in East Texas. The majority of the participants in the focus groups were prior attendees at the informational sessions for Hispanics interested in starting their own farms given by Texas A&M University-Commerce. The recruitment method was verbal, using a script and through distribution of flyers for recruitment. The participants were invited to a meal in one of the targeted counties. Table 1 shows the profile information for each focus group.

Table 1

Focus Groups Profile Information

Focus group	Background	Total number participants	Female	Male
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1	Students members of the Latino Agricultural Student Speakers Outreach (LASSO)	6	4	2
2	County 1- Participants of “Breaking Barriers” program	6	5	1
3	County 2- 4 participants of “Breaking Barriers” program, others recruited by opinion leader in the group	14	8	6

Data Collection

Three focus group interviews with 6-14 people in each group were carried out for data collection. The primary investigator served as the moderator and the support of an assistant moderator was available. The moderator kept the conversation flowing and maintained a non-threatening environment (Fuhrman & Rohs, 2011). The assistant moderator took notes and observations of each focus group. A non-Spanish-speaking team member was also present to observe activities and interactions of the participants, physical setting, participant conversations, and moderator behavior. Merriam (2009) suggested that having a thick description of the setting and participants contributed to the transferability of the findings to future outreach initiatives. Interviews were conducted in Spanish and recorded. Afterwards they were coded and translated into English. The data collection procedures were approved by the Institutional Review Board (IRB). Both English and Spanish examples of the Informed Consent Form accompanied the IRB protocol.

After each focus group interview, there was a debriefing between the moderator and assistant moderator to capture first impressions and highlights. At the end of each focus group session, the assistant moderator provided a summary of key points to the participants for verification. The recordings were transcribed and analyzed in Spanish, and then translated into

English by the primary investigator whose first language is Spanish. The translation was reviewed and edited, if needed, by the assistant moderator who is also fluent in English and Spanish. The transcripts were open coded to identify categories and then an axial coding was used to identify relationships and connections between the final categories.

The analysis was inductive and comparative, where the researcher immersed in the data collection. This means comparing other things that were coded the same way, thus maintaining a close connection between categories (Merriam, 2009). Comparisons were made within groups and among groups. The information was then analyzed to identify patterns or trends in discussion. The analysis continuum followed recommendations by Morgan and Krueger (1998), which included raw data, description, interpretation, and recommendation. Data management included preparation, identification, and manipulation, as prescribed by Merriam (2009).

Data analysis

The coding of data followed a systematic and structured process, which included a verbatim transcript of recordings of focus group sessions in Spanish, open coding in Spanish, translation into English, and finally, axial coding of categories. The translation was conducted by the principal investigator whose first language is Spanish. Translations were also reviewed and edited, if needed, by the assistant moderator who is also fluent in Spanish and English.

The open coding resulted in categories for each question, followed by supporting quotes; this was done for each focus group. Once the open coding was translated in English, the axial coding was done to make connections and look for relationships among categories. The axial coding allowed unifying certain common categories into one category, keeping consistent with the format for each question in each focus group interview. This process was also supported by the assistant moderator and observer notes as well as debriefing recordings and notes.

Finally, the repetitive categories from each question for each focus group were combined with their consolidated supportive quotes. This resulted in overall categories for each focus group. At the end, there were twelve themes that emerged among the three focus groups plus one relevant category in the third focus group (number 13).

Researcher Subjectivity Statement

Reflexivity refers to “the process of reflecting critically on the self as researcher, the human as instrument” (Lincoln and Guba, 2000, p.183, as cited in Merriam 2009). In this case the researcher was the main instrument for data collection. This gives an opportunity for a researcher to explain potential biases regarding the study an interpretation of the data (Merriam, 2009). The researcher is of Hispanic background and is passionate about working with Hispanic population, specifically on the role of culture in agricultural aspects. Some of the participants of the study were involved in grant project funded by USDA “Breaking Barriers”, where the researcher was a team member of the project. The inherent interest of the researcher in this population and involvement in the project provide potential bias, however, the main objective was to identify the needs and barriers that exist to improve the services provided. It is expected that the researcher will be careful when collecting data in a way that any personal biases will not influence their observations (Ary, Jacobs, & Razavieh, 2009).

Results/Findings

Emerging Themes

Family support (importance of the family union and support provided as an individual and as a whole unit). Among the three focus groups, with one group being young Hispanic agriculture students, it was observed that familism, the importance of the family in an individual's life, is reflected clearly in their answers. They highlighted the importance of education and family support. One participant said: "The most important thing is family union, what is the purpose of having a separated family?, it is like having a house, if a wall is out of place, it is going to fall." The young Hispanic group focused most of their responses on the needs and concerns they had towards their parents, as expressed "My parents can't go to school and they didn't study in Mexico (...) technology is also advancing and they need to learn a little bit more." On the other hand, the adult group focused their responses on concerns they had for their children, one participant said, "My children need to be better than me, for their future, that is what you want as a parent, for them to live better than us."

Education (higher education is seen as a way to improve their lifestyle, but also the importance of education at home: teaching values and principles). As a priority need, they mentioned education for both youth and adults who have empirical knowledge, but seek more technical knowledge in agriculture. Participants indicated that with education they will be able to overcome challenges and have a better future. This is the main reason why most came to the United States, which they perceive to be a country of opportunities. One participant highlighted, "I always tell my children, we came to this country with a purpose, so they had a better life (...) they have to prepare themselves, they have to move forward (...) even though they challenge me, they tell me, even though you are older you have to prepare yourself, that I have to study." Education begins and is supported by the family, but with the support of agencies, institutions, and government participants can take advantage of more opportunities. One participant concluded, "Everything came out from education and preparation, but you can't have that without the support of your family."

Culture (traditions, behaviors, beliefs, values, and the common ground they share with their community, which is transmitted from generation to generation). There was concern for the young generations to preserve and transmit their culture to future generations. One participant said: "For me it is important to educate my son and teach him Spanish, because my husband is an American, but also I need to teach my son not to have the fear my family had, that I had, tell him that there are opportunities and doors to be opened everywhere." They mentioned gender discrimination in agricultural jobs, a participant stated, "I would have liked to work in a ranch, but it is too bad that they do not give women the same opportunity."

Communication (communication with agencies and among family members). Most participants were not aware of the services available from state and federal agencies. They expressed that communication has not been successful, which could be one of the reasons for the lack of participation of Hispanics in existing programs. One participant said: "Sometimes you do not know the benefits, like in the school they have a lot of benefits, and sometimes you just don't know." They considered the form of communication that the agencies should have with older people must be more friendly and face-to-face. One participant expressed it like this: "(...) It is

best face-to-face, I think the people that teach them should be common people (...) One prefers to talk with someone of your own race, like they look like them.”

Economic Stability (money and economic fluency to meet their basic needs and start their own business). The lack of knowledge in the financial administration and investment analysis made them doubt as well because of the uncertainty of their immigration status. One participant said: “They don’t know how to use that money and they waste it...they don’t know how to manage the money and they lose a lot.” Another participant expressed, “Save and invest in something that will probably not be there tomorrow.”

Immigration status (how legal status of individuals in the United States affects their lives). They perceived that a legal status would bring mutual benefits for the individual and for the country’s economy. One participant said, “If everyone was fix, they will have more jobs, more money, it will help the economy, so it is a double benefit, because we will feel more peaceful here in the United States, be with all the family without problems, because now like you see a lot of people say, I see a policeman and I go the other way.” The difficulties to start their own business were also affected. One participant said: “I think the first thing one thinks as an obstacle is the legal status, and you start saying, I can’t do this because they are going to ask for this, I can’t get this other thing, I can’t do this procedure, we say NO to too many things, and you get stuck.”

Services (existent relationships with agencies such as schools, health, and government agencies). The participants mentioned the importance of having a Hispanic staff in the agencies to serve them better and break the barriers. One participant suggested, “Maybe right now there are not many Hispanics involved in the agencies of that size and we will need a Hispanic, so they can know our needs, Hispanic needs.” Another participant said, “I think Hispanics identify with the needs of other Hispanics, because is the same culture, because sometimes the needs are unknown.”

Agriculture (interest in agriculture and perceptions of agriculture in their lives). One participant said: “Agriculture is something that unifies the family, because my father and many Hispanics grew on a ranch and that is what they know how to do.” They expressed there should be more attention given to the participation of the youth in FFA and guide to take advantage of the opportunities it offers. One participant stated, “I would like more meetings like this, for the FFA, from high schools, Latin kids, there are not many (...) make a curriculum for those that want to get here.”

Fear (shyness, fear to communicate, or ask for information). They recognized that shyness exists when trying to access information. One participant said, “You are ashamed of asking people.” Other participant said: “Shame, I think it’s a barrier that also affects, not being able to move forward, also shyness, so I think those are the things that affect.” Fear is also connected to *Language* (as a limitation to communicate and access information). One participant said: “Another thing is language, it’s another barrier, even though one can say, I do understand, but not 100%, there are a lot of important things, when you want to start a business, you want to understand 100%, so that is a barrier.”

Vision and opportunities (as part of their lives to be successful, to take advantage of the opportunities presented to them and have established goals). One participant said: “Many

Hispanics families come to the United States to have a better life and they want a better life for their kids.” In some cases that vision includes *How to start their own business* (lack of understanding as a limitation to start their own business). Participants recognized that they must do a double effort to overcome barriers, and that when they come to this country, they must start from zero. One participant said: “The problem was how to find out what to do [start a new business], we don’t speak very good English, it was a problem and all the paperwork was very hard for someone to understand.”

Community leader (a category that was present in the last focus group, the importance of a leader in their community for obtaining information and decision making). It was highlighted the importance of a community leader as a reference point to access information about the opportunities, as well as a moral support and advisor in the decision-making process. It is key to identify a community leader for calling community members to participate in development programs. One participant said: “I want to say thanks to Mrs. Alvarez, she has been a guide for me, she helped me a lot with Regina, when she got out of school and I did not want to let her go to college, she told me to give her a chance.”

As the nature of a qualitative study; the results cannot be generalized further than the participants of the study. Transferability of the findings is possible for potential participants of the target counties of study, by providing a thick description of the participants and the setting.

Conclusions/Implications

According to Lopez and Suvedi (2009), Hispanics become farm owner operators because they consider agriculture a profitable activity. Working in a farm is also part of their heritage, involves family values, allows them to be their own boss, and have a better lifestyle. Our participants also perceived agriculture as a way of subsistence, for their own use, and as a family activity and tradition. There is a need to increase the services to Latino farmers and ranchers, contributing to the future of agriculture and their potential role as industry leaders as previously indicated by Marinez and Gomez (2011). Concern existed for the future preparation of the youth in agriculture. They recognized the importance and relevance of the agriculture sector and the importance of the professional preparation of the youth in agriculture.

The youth were aware of the importance of their education and preparation as professionals to increase their knowledge and not to only be “farmers” but agriculture professionals. They admitted that education opened their eyes to an array of opportunities and services available. Starkweather et al. (2011) reported that Latino farmers come from agricultural backgrounds, and they see farming as a lifestyle and most of their knowledge is learned from experience. It is also mentioned that the current Hispanic farmers need technical knowledge to support their empirical knowledge and be updated about the technological advances to maximize their production and benefits in agriculture. There is a need to increase the services for Hispanic farmers and ranchers, but mostly improve the communication strategy from the agencies.

Our focus groups participants recognized that their immigrant status limits them to obtain only low-paying jobs, with intensive labor which limits their economic fluency. The immigrant status creates a demotivation in the agriculture production as main business, because of low payments of products. The agricultural sector is dependent on undocumented immigrants that

conduct repetitive tasks, with no career development, and low wages (Callan, 2011). Hispanics tend to have average wages 40% below of those of natives (Petersen & Assanie, 2005). It is also a reality that most Hispanics come to the U.S in search of the “American Dream” (Garcia-Pabón & Lucht, 2009). Participants agreed that they all came to the United States in search for a better life and opportunities, what they call the “American dream.” Due to the rapid growth of the Hispanic population in the U.S. workforce, it is important to understand the level of acculturation and how to effectively integrate them in teams, leadership positions and other organizational roles (Romero, 2004).

Family union and support are the fundamental pillars for the development of the Hispanic family as a whole and as individuals. Their integration in society should support their culture, because both adults and youth express concerns of losing their culture identity and heritage in their current and future generations towards their exposure to the American culture. Learning the English language was important for participants’ personal growth as individuals, for work, to start their own businesses, and support their children’s education and activities. Technical support in agriculture, business planning, administration, and finances was identified as a need.

The fear, insecurity, and perceived discrimination for their immigrant status creates a big barrier. They admitted the existence of fear in the Hispanic community for being minority and they are afraid to express themselves. According to Martinez and Gardner (2011), Latinos face discrimination in institutions based on social networks, where they are very selective, to have access to the information they require, which results on Latinos relying on themselves and their networks. Participants lack knowledge about their right and responsibilities in the United States and information on how to access the best options for health insurance, education, loans, and government agencies was also needed.

Recommendations

The Hispanic youth and adults in this study were aware of the opportunities they have in this country, as well as the sacrifices they went through to be here. For the youth, all this relates to their future potential and having better opportunities than their parents. Easier ways to access these opportunities should be made available. Addressing these basic needs and concerns such as family, education, culture, finances, immigration, health, and communication will allow the successful adoption of development programs, including a better use and application of agriculture programs offered by extension and the USDA.

It is recommended that universities and government agencies take in consideration the results revealed in this needs assessment for future training and outreach opportunity to support this segment of the population. Some of the recommendations include offering education in family issues by experts on topics such as interpersonal relations, family coexistence, parent-children relationships through different life stages, and the adaptation to the new culture while maintaining their own. Continue facilitating conditions for learning the English language for adults. On the other hand, training in administration of finances and introduction to good credit practices would be very beneficial.

It is important to capitalize on the agricultural interests of Hispanic families by encouraging youth to enroll in secondary agricultural education and participate in FFA. Promote careers in farming, ranching, and professional employment in the agricultural industry. To

support these initiatives, it is recommended to create a Hispanic information system. This information system should include programs, projects, initiatives, and proposals available to the Hispanic community through private sources and public agencies. Local information centers in strategic places with a high Hispanic population can be created. These centers should be managed by staff fluent in Spanish and English who are knowledgeable about opportunities available to Hispanics. Ideally, once established, these centers should be self-sustaining. Potential exists for these centers to be managed through local community-based organizations, public schools, community colleges, or universities.

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