

TEACHING LEADERSHIP IN AGRICULTURAL SCIENCE: BEHAVIORAL FACTORS THAT INFLUENCE SECONDARY AGRICULTURAL SCIENCE LEADERSHIP INSTRUCTION

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Abstract

This study sought to explain why agricultural science instructors teach leadership in their classrooms. The variables measured were instructor leadership teaching behavior, instructor attitude towards teaching leadership, instructor demographics, instructor leadership knowledge, and instructor expectations of students after the teaching of leadership. In this national study 400 participants were contacted and 167 responded to the questionnaire. This study revealed that instructor attitude towards teaching leadership, selected instructor demographics, and instructor expectations were significant predictors of instructor leadership teaching behavior. Instructor leadership knowledge had no significant contribution to instructor leadership teaching behavior. It was recommended that pre-service instructors be encouraged to take a leadership course so they will be better prepared to teach leadership concepts as an instructor; leadership professional development programs should be offered to current instructors to increase instructor leadership knowledge; and teacher preparation institutions should provide pre-service instructors with LifeKnowledge curriculum training so new agriculture instructors will be prepared to teach leadership in agricultural science classrooms.

Introduction/Theoretical Framework

The extent to which leadership is being taught in agricultural science classrooms is unknown, and the attributes of high school agricultural science instructors that influence their decision to formally teach leadership are unclear. Research has been conducted to determine predictors of agricultural science program quality (Vaughn & Moore, 2000), agricultural science coursework taught in urban schools (Trede & Russell, 1999), and how leadership skills affect youth (Carter & Spotanski, 1989; Dormody & SeEVERS, 1994a; Ricketts & Newcomb, 1984; Rutherford, Townsend, Briers, Cummins, & Conrad, 2002; Townsend & Carter, 1983) and community (Brannon, Holley & Key, 1989) but no research has been conducted to determine the extent to which leadership is being taught in the formal agricultural science classroom or why high school agricultural

science instructors choose to teach leadership.

The need for people with leadership skills will increase in the coming decades. As baby boomers retire, they will take with them leadership skills that have benefited the workforce. Due to the lower birthrates in the 1960's and 1970's, a smaller pool of young talent will be available to fill future leadership positions, causing a leadership void (Figura, 1999). To help fill this void, high schools should teach leadership skills to youth so they may be prepared to assume these leadership positions (Barrett, 1983). Students who have been taught leadership are better prepared to act in a leadership capacity because they better understand the phenomena of leadership as a personal and attainable undertaking (Ricketts & Rudd, 2002).

Over the previous twenty years, research has shown that participation by high school students in FFA activities increases the self-

perceived leadership skills in youth (Dormody & Seevers, 1994b; Ricketts & Newcomb, 1984; Rutherford et al., 2002; Townsend & Carter, 1983; Wingenbach, 1995). Yet, not all youth enrolled in agricultural science courses participate in FFA activities. Some may be FFA members and choose to not participate in these activities, while others are enrolled in agricultural science courses and do not join FFA. If leadership is to be taught to these students, it must be taught in the classroom rather than through out-of-class activities. A curriculum to teach leadership in the classroom was needed for agricultural science instructors.

The LifeKnowledge curriculum was developed to fill this need. The curriculum grew out of the mission statement of the National FFA Organization (2003): "To make a positive difference in lives of students by developing their potential for premier leadership, personal growth, and career success through agricultural education" (p. 4) This curriculum provides quality instructional materials so instructors can infuse premier leadership, personal growth, and career success into every facet of agricultural education and to provide instructors with additional practical learning strategies and corresponding instructional materials to empower youth to live the FFA mission every day (Derner, 2004). While the LifeKnowledge curriculum addresses the three areas of the FFA mission statement, this study addressed only the leadership component of this curriculum which frames leadership as knowing one's own self so they can influence other people.

To assist in describing and explaining the teaching behavior of agricultural science instructors the Triandis behavior model (1971) was chosen. This model has been successfully used in previous studies to explain the behavior of agricultural science instructors (Rudd & Hillison, 1995). This model uses four indicators to explain human behavior: attitude, social norms, habits, and expectations. Fishbein & Ajzen (1975) discussed that a person's attitude toward a particular activity is related to their behavior of that activity. For the purpose of this study, attitude is defined as "a mental position with regard to a fact or state"

(Merriam-Webster, 2003) towards teaching leadership.

Triandis (1971) defined social norms as "what people think they should do" (p.14), based upon experiences or beliefs. Although no studies could be found that defined the social norms associated with teaching leadership in agricultural science, elements of leadership education in agricultural science classrooms measured by researchers in previous studies were public speaking, judging contests, chapter banquet, committee work, leadership camp, parliamentary procedure, state conventions, proficiency awards, national convention, program of activities planning, and holding FFA office (Brannon et al., 1989; Clark, 1977; Dormody & Seevers, 1994a; Karr, Keith, Lockaby, & Vaughn, 2001; Ricketts & Newcomb, 1984; Rutherford et al., 2002; Thorp, Cummins, & Townsend, 1998; Townsend & Carter, 1983; Wingenbach, 1995). Because these elements of leadership are found in multiple studies it is concluded that these elements are most likely what agricultural science researchers believe are the social norms of secondary agricultural leadership, and as such, are generally the same for each instructor, being "reflected in the current condition of agricultural education" (Rudd & Hillison, 1995). Because they are similar for agricultural science instructors, they are considered a constant and can be excluded from the behavioral model.

Habits are defined as what a person had usually done (Triandis, 1971) and are based upon experiences, which are influenced by knowledge (Lee, 2000). Likewise, a person's past experiences are a function of his/her demographics (Taylor, Basen-Engquist, Shinn, & Bodurka, 2004; Variyam, 1999). Therefore, a person's habits are a function of his/her knowledge and demographics. In this study, habits will be measured through high school agricultural science instructors' knowledge (Peasley & Henderson, 1992; Rudd & Hillison, 1995) of leadership concepts and high school agricultural science instructor demographics (Connors & Elliot, 1994).

Expectations are measured as expected benefits or outcomes of teaching leadership to students (Mischel &

Mischel, 1977; Rudd & Hillison, 1995; Fishbein et al., 2001). The modified

behavioral model is diagrammed below in Figure 1.

$$f \text{ Behavior} = \text{Attitude} + \text{Knowledge} + \text{Demographics} + \text{Expectations}$$

Figure 1. Theoretical model of behavior.

Purpose and Objectives

The purpose of this study was to explain why agriculture instructors taught leadership in their classroom. This study sought to address the following objectives:

1. Determine the demographic characteristics of high school agricultural science instructors.
2. Determine the extent to which leadership was being taught in high school agricultural science classrooms.
3. Based on National FFA LifeKnowledge leadership curriculum, determine high school agricultural science instructor leadership knowledge.
4. Determine high school agricultural science instructor attitude towards teaching leadership.
5. Determine the expectations that high school agricultural science instructors had of the agriculture students after leadership had been taught.
6. Explain the relationship between high school agricultural science instructor leadership teaching behavior and high school agricultural science instructor leadership knowledge, high school agricultural science instructor attitude towards teaching leadership, high school agricultural science instructor expectations of students, and high school agricultural science instructor demographics.

Methods and Procedures

The study was conducted using survey research, and a correlational, *ex post facto*

design. The dependent variable measured was instructor leadership teaching behavior as determined by the extent to which leadership is being taught in the high school agricultural science classroom. Independent variables measured were instructor attitude towards teaching leadership, instructor leadership knowledge, instructor demographics, and instructor expectations after teaching leadership to students. The measures of instructor behavior, instructor knowledge, and instructor expectations were developed using lesson objectives from unit two of the LifeKnowledge curriculum (National FFA Organization, 2003). A survey instrument was developed in a paper format for mailings and as a web page for use on the Internet.

The population for the study was all FFA advisors at high school agricultural science programs (National FFA Organization, 2002) with the exception of FFA advisors in five states where the LifeKnowledge curriculum had been pilot tested and the instructors had been exposed to the curriculum: Kansas, Maine, Nebraska, New Jersey, and Pennsylvania. The study was conducted prior to the national release of the LifeKnowledge curriculum and programs included in the study were identified through the National FFA Organization.

Nationally, there are 7,193 high school agricultural science programs (National FFA Organization, 2002). A 95% confidence level with 5% sampling error was chosen for this study. Based on sample size information from Dillman (2000), a sample size of 367 was required. To account for incorrect addresses, inactive programs, etc. a sample size of 400 was chosen. Using a list of active FFA chapters provided by the National FFA Organization, 400 participants

were selected by simple random sample selection.

Section I of the instrument measured instructor leadership teaching behavior based on content areas contained in unit two of the LifeKnowledge curriculum. Using a series of 30 statements high school agricultural science instructors were asked if they taught leadership by indicating either *yes* they devoted a class to the particular concept or *no* they did not teach the concept (Connors & Elliot, 1994; Rudd & Hillison, 1995). The greater the number of leadership concepts taught, the greater the level of instructor leadership teaching behavior.

Section II of the instrument measured high school agricultural science instructor expectations of the student for each of the leadership content areas in unit two of the LifeKnowledge curriculum. Twenty-two expectation statements were provided and a dichotomous scale was used to record the participant's responses: *yes* if they expected the student to perform the action, or *no* if they did not expect the student to perform the action (Rudd & Hillison, 1995).

Section III of the instrument measured the leadership knowledge of the instructors. Fifteen questions from the lesson objectives and evaluation tools found in unit two of the LifeKnowledge curriculum were used (National FFA Organization, 2003). Questions were in the form of true-false and multiple-choice.

Section IV of the instrument measured the high school agricultural science instructor's attitude towards teaching leadership using a semantic differential technique consisting of 12 pairs of words. Word pairs were determined using established pairs of terms (Jenkins, Russell, & Suci, 1958; Rudd, 1994).

Section V of the instrument addressed demographic questions about the high school agricultural science instructor. Questions asked were school location, highest level of education, gender, if they had been certified through a university agriculture teacher certification program, was their bachelor degree in agricultural education, FFA membership in high school, FFA chapter officer in high school, FFA office above chapter level, age, years teaching agriculture, years teaching in

current position, number of agriculture instructors at school, number of leadership courses taken in college, number of offices held in student leadership organizations other than FFA, offices held in college student organizations, offices held in professional education organizations, number of offices held in civic organizations, membership in professional development organizations, number of offices held in professional development organizations, participation on state or regional agricultural science committees, number of workshops or seminars conducted for agriculture instructors, number of workshops or seminars conducted for non-agriculture instructors, number of leadership positions held in local school or vocational department, number of times they attended the Advisors' Washington Leadership Conference, and if a leadership course was taught in their agricultural science program (Miller, Kahler & Rheault, 1989; Vaughn & Moore, 2000). The instrument was checked for validity by a panel of experts consisting of agricultural education and educational leadership faculty members.

To pilot test the instrument, subjects ($n = 40$) were selected at random from the Nebraska FFA chapters on the FFA Active Chapter List. A modified version of the Tailored Design Method (Dillman, 2000) was used for data collection which allowed the participants to respond online or by mail. Twenty pilot instruments were returned for a pilot response rate of 50%. Pilot instrument reliability was analyzed to determine Coefficient alpha based on the three instruments' constructs. From these results, the following changes were made to the instrument. Section I had a reliability of $\alpha = 0.92$. Two questions were removed to increase the reliability to $\alpha = 0.93$. Section II had a reliability of $\alpha = 0.79$. Eight questions were removed to increase the reliability to $\alpha = 0.81$. Section IV, the semantic differential, had a reliability of $\alpha = 0.91$. No changes were made to this portion of the instrument.

A modified version of the Tailored Design Method (Dillman, 2000) was used for data collection. The pre-notice letter provided instructions describing how the instrument could be accessed via the Internet

and that a paper instrument would be mailed soon. The response rate for the study was 41.8% ($n = 167$). Based on the sample size formula in Dillman (2000), the 167 responses of this study allow the results to have a 95% confidence level with 7.5% sampling error.

To control for non-response bias, the responses of early respondents ($n = 130$) to late respondents ($n = 37$) were compared (Miller & Smith, 1983). Late respondents were those participants who returned their survey after the third contact. Independent sample t-tests were conducted on each variable of interest and no significant differences were found. Likewise, a t-test was conducted to compare participants that responded using the paper instrument sent in via the mail ($n = 96$) and the participants that responded using the Internet web-form ($n = 71$) and no significant differences were found.

Post-hoc instrument reliability was analyzed to determine coefficient alpha based on the three instruments' constructs. Section I had a reliability of $\alpha = 0.95$, section II had a reliability of $\alpha = 0.84$, and section IV had a reliability of $\alpha = 0.92$.

An alpha level of 0.05 was set *a priori* for the statistical analysis. The results of this study can only be extended to the population studied, which was high school agricultural science instructors in the United States during the 2003-2004 school year.

Results/Findings

Of the 167 participants, 114 were males and 53 were females. The age of the participants ranged from 23 to 61, with an average age of 39.37 years. The number of years teaching for participants ranged from one to 38, with an average of 14.85. The number of years teaching in their current position ranged from one to 34, with an average of 10.61.

The number of agriculture instructors at the school ranged from one to six, with an average of 1.56 instructors per department. Of the 156 participants that responded to this question, 59.0% ($n = 92$) were located in one-instructor departments and 32.1% ($n = 50$) were in two-instructor departments,

5.1% ($n = 8$) were in three instructor departments and 3.8% ($n = 6$) were in a four or more instructor department.

When participants were asked to describe the community in which their school was located, 73.4% ($n = 113$) indicated their schools were in a rural community, (population <10,000), 16.2% ($n = 25$) taught in a suburban community (population 10,000-49,000), and 10.4% ($n = 16$) taught in an urban community (population >49,999) (Pennsylvania State University, 2004; U.S. Census Bureau, 2004; Wingenbach, 1995). For determining correlational relationships, the community locations were coded as dichotomous dummy variables.

When asked if a leadership course was taught in their agricultural science program, 52.6% ($n = 82$) indicated this did occur. In terms of college leadership instruction, 73.1% ($n = 114$) had taken one or more college leadership courses. Membership in one or more professional development organizations, such as Toastmasters, was held by 79.2% ($n = 126$) of the participants, and 36.1% ($n = 57$) held an office in a professional development organization.

Overall, 92.9% of the participants were teaching at least one of the surveyed LifeKnowledge leadership concepts in their classrooms, with an average of 18.73 surveyed leadership concepts being taught in agriculture classrooms. When viewed as a percentage of the 28 leadership concepts surveyed, 69.9% of the leadership concepts surveyed were taught in an average agricultural science program. Participants taught the most lessons on the following leadership concepts: leaders are important, how to identify leaders, and how to develop a vision for the future.

The construct of instructor attitude towards the teaching of leadership had a possible range of 12-72. The range by respondents was 25 to 72 with an average of 64.69 out of 72. In addition, of the 15 questions asked to assess instructor leadership knowledge, the average instructor answered 10.19 questions correctly, equating to 67.9% correct. If the knowledge scores were viewed as percentages, it could be said that scores ranged from 27% correct to 100% correct. The questions answered

correctly most frequently by the participants were, "Something that someone wants to achieve is a: Goal," "Delegating tasks takes more time than it saves: False," and "Discouragement and giving up on a project is part of being responsible and accountable: False." Questions answered incorrectly most frequently by the participants were, "Being responsible and accountable means: Being answerable for key areas of our life with qualified people," "Personal self-worth is: The value I place in my own contributions," and "When a person has dedicated time and effort to improving themselves (and their lives) in the areas of social/family life, work/school life, and personal life, we call this: Balance."

Of the 22 questions used to determine instructors' expectations of students, the participant's responses ranged from 4 to 22, with an average of 17.45. If the mean was viewed as a percentage of the number of

questions asked, then participants agreed with 80% of the expectations. Participants responded "yes" most frequently to the following statements: "After my students learn about self-worth I would expect students to have greater confidence in their own ideas," "After my students learn about leaders I would expect students to identify ways they can lead others," and "After my students learn about goals I would expect students to demonstrate how to prioritize personal goals."

A Pearson's Product Moment Correlation table was constructed using the demographic variables, and the constructs of instructor leadership teaching behavior, instructor attitude towards teaching leadership, instructor leadership knowledge, and instructor expectations after leadership has been taught. The correlations for selected variables in relation to instructor leadership teaching behavior are provided in Table 1.

Table 1

Pearson's Product Moment Correlations Between Instructor Leadership Teaching Behavior and Selected Variables (n=156)

Variables	Instructor Leadership Teaching Behavior
Leadership course taught in agricultural science program ^a	0.44*
Instructor attitude towards the teaching of leadership	0.38*
Gender ^b	0.23*
Number of leadership courses taken in college	0.22*
Instructor expectations of the students after leadership has been taught	0.21*
Membership in professional development organizations	0.20*
Number of offices held in professional development organizations	0.19*
Urban location of school ^a	0.19*
Three-instructor department ^a	0.18*
Years teaching	0.16*
Instructor leadership knowledge	-0.05

^a Yes coded as 1, No coded as 0. ^b Males coded as 1, Females coded as 0.

* $p < .05$

The variables with significant correlation to the construct of behavior were leadership course taught in agricultural science program ($r = 0.44$), instructor attitude towards the teaching of leadership ($r = 0.38$), gender ($r = 0.23$), number of leadership courses taken in college ($r = 0.22$), instructor expectations after leadership has been taught ($r = 0.21$), number of offices held in professional development organizations ($r = 0.20$), membership in professional development organizations ($r = 0.20$), urban location of school ($r = 0.19$), three-instructor department ($r = 0.18$), and years teaching ($r = 0.16$). These variables were then placed into SPSS® 12.0 for Windows to develop an explanatory regression model.

Backwards multiple linear regression was chosen because it is most appropriately used when the research goal is primarily exploratory (Gliem, 2003). Using this technique, a significant explanatory model was developed with a R-square value of 0.35 and an adjusted R-square value of 0.33, $F(4,145) = 19.15$, $p < 0.05$. This model used the explanatory variables leadership course taught in agricultural science program, urban location of school, gender, and instructor attitude towards the teaching of leadership, and significantly explained 33% of the variance in instructor leadership teaching behavior, the dependent variable (Table 2).

Table 2.

Backward Regression Explaining Instructor Leadership Teaching Behavior (n=145)

	B	SE	Beta	t	Sig.
(Constant)	-11.79	5.64	--	-2.09	0.04
Leadership course taught in agricultural science program	6.12	1.16	0.37	5.28	0.00
Instructor attitude towards the teaching of leadership	0.38	0.09	0.30	4.39	0.00
Gender	3.37	1.29	0.18	2.62	0.01
Urban location of school	4.75	1.84	0.18	2.58	0.01

Note: $F(4,145) = 19.15$, Adjusted $R^2 = 0.33$.
 $p < .05$

Conclusions and Recommendations

Based on the findings of this study the variable leadership course taught in agricultural science program had a significant, although not surprising, correlation with instructor leadership teaching behavior. The fact that a leadership course was being taught in the agricultural science program may lend itself to the teaching of the specific LifeKnowledge curriculum leadership concepts surveyed.

As mentioned previously, the modified Triandis model uses attitude as a predictor

of behavior. This study validated that attitude is positively correlated with behavior and reinforces the importance attitude has on behavior. This finding supports Fishbein and Ajzen (1975), "attitude toward the behavior is often related to performance of the behavior" (p.382). This also reveals that high school agricultural science instructors with a positive attitude toward teaching leadership may be more inclined to teach leadership.

Gender also had a significant correlation with instructor leadership teaching behavior, revealing that males were more likely to

teach leadership concepts than females. The findings of this study suggest that females teach less leadership than their male counterparts. Although it is possible that women prefer to teach less leadership, there are most likely other reasons for this finding.

A significant relationship was found with number of leadership courses taken in college. Taking a leadership course in college may provide sufficient leadership knowledge, and self-confidence of the subject matter, for the behavior of leadership instruction to occur.

Participant answers to the 22 questions used to determine instructors' expectations of students were summated for statistical analysis. When this construct was correlated with instructor leadership teaching behavior the relationship was significant. This finding supports the modified Triandis model (Rudd & Hillison, 1995) and the work of other researchers (Fishbein, et al, 2001), that a person's expectations of the results of a behavior influence their performance of that behavior. As applied to this study, instructors who expected students to benefit from leadership instruction were more likely to teach leadership in the classroom.

Instructors teaching in an urban school location had a significant positive relationship with instructor leadership teaching behavior because many urban programs tend to focus on leadership, environmental science and biotechnology (Trede & Russell, 1999). In addition, many programs in urban locations have less emphasis on production agriculture skill areas and may be more likely to teach stand-alone courses on subject areas such as leadership (Trede & Russell).

One other variable studied in the modified Triandis behavioral model had a correlation worth noting. When instructor leadership knowledge was correlated with instructor leadership teaching behavior a non-significant relationship emerged. In the modified Triandis model, as knowledge increases so does the individual's behavior, yet the findings of this study did not support this theory. It appears that participants believe they have knowledge of leadership concepts because many teach leadership concepts in class, but when evaluated using

leadership definitions from the National FFA's LifeKnowledge curriculum, leadership knowledge is moderate.

The reason for this digression from the behavioral model deserves additional investigation. Based on the modified Triandis behavioral model and the findings of this study a perceived high level of leadership knowledge may be sufficient to influence behavior, rather than possessing a high level of factual leadership knowledge. Some instructors may equate leadership and leadership education with parliamentary procedure and public speaking, while the LifeKnowledge curriculum views leadership as knowing one's own self so he/she can influence other people. It may also be that instructors have a general knowledge of leadership, but knowledge about the specific elements of leadership, as presented in the LifeKnowledge curriculum, are unfamiliar to agriculture instructors.

The variables leadership course taught in agricultural science program, instructor attitude towards the teaching of leadership, gender, and urban location of school were included in the regression model that best explained total variance in agricultural science instructor leadership teaching behavior. This model significantly explained 33% of the variance in instructor leadership teaching behavior, the dependent variable. Although explaining 33% of the variance is laudable, 67% still remains unexplained, allowing room for additional research in this area.

Based on this information, the best predictor of instructor leadership teaching behavior is if a leadership course is currently being taught in the agricultural science program. This would appear to be an expected finding, except for two relevant facts. First, the social norm is leadership consists of activities such as teaching parliamentary procedure and attending the state FFA convention, yet these were not the items measured to determine instructor leadership teaching behavior. The behavior construct used in the questionnaire asked if instructors were teaching leadership concepts as defined by the LifeKnowledge curriculum, which does not include the social norms. This finding reveals that instructors teaching a leadership course in

the agricultural science classroom were teaching leadership concepts similar to those found in the LifeKnowledge curriculum.

In this study, instructor attitude was an explanatory variable of leadership teaching behavior. This illustrates the importance of a positive attitude toward teaching leadership before leadership instruction will occur.

Gender was also an explanatory variable in this model, and revealed that male participants in this study were more likely to teach leadership than female participants. Crosstabs was conducted to attempt to gain a further understanding of this relationship, but no additional information was revealed. There may be a number of explanations for this occurrence. It may be that female instructors in multiple instructor departments do not have the opportunity to teach courses that allow leadership concepts to be taught. Perhaps the locations at which female participants teach do not allow the flexibility for the incorporation of leadership concepts into the courses. Based on the findings of the study only speculative answers can be gleaned. The finding of this relationship raises a number of questions that require further research for complete understanding. One question to be addressed is what courses are these female agriculture instructors teaching, and how do these courses compare to their male counterparts.

Finally, urban location of school was an explanatory variable in this study, indicating that agriculture instructors in urban locations were more likely to teach leadership in the classroom. Based on the findings of this study we have gained some insight into the demographic differences between urban and rural agriculture instructors, but do not have sufficient information to fully understand why urban location has such explanatory power. More research should be undertaken to better understand this relationship.

Because enrollment in a college leadership course was positively related to leadership instruction, it is recommended that pre-service instructors be encouraged to take a leadership course so they will be better prepared to teach leadership concepts as instructors. In addition, since instructors are teaching leadership with a moderate

amount of leadership knowledge, leadership professional development programs should be offered to increase instructor leadership knowledge. The results of the knowledge component of the instrument used in this study may be beneficial for developing these programs.

Finally, teacher preparation institutions have the potential to influence the adoption of the LifeKnowledge curriculum and should provide pre-service instructors with LifeKnowledge curriculum training so they will be prepared to teach leadership in agricultural science classrooms. Approximately 85% of high school agricultural science instructors graduate from university agriculture teacher education programs (Morgan, 2004), indicating that university teacher preparation programs, through pre-service training, can influence a majority of the instructors in the profession. Doing this may help prepare future agriculture instructors to equip youth with leadership skills needed for the new century.

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