An Assessment of the Relationships between Involvement in the High School Agriculture Program and Students' Academic, Applied Academic, and Leadership Abilities

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Introduction

The curricular structure for agricultural education, including classroom teaching, supervised agricultural experience, and leadership development through the FFA Organization serves as a model whereby educators at all disciplines could conceptualize teaching and learning. Active learning and problem solving through classroom teaching, student development through the FFA, and authentic learning through SAE provide a key framework for the development of students' academic and leadership abilities as productive and competent workers and citizens in an ever-changing society.

Little research exists regarding the impact of Agricultural Education on student-related outcomes such as leadership skills and academic achievement. What difference or impact does participation in Agricultural Education have on students' applied academics? Further, what impact does Agricultural Education have on students' perceived leadership abilities or involvement in leadership activities? An academically capable workforce and well-informed and highly involved citizenry are two important qualities for Americans as a productive society. Determining the answers to these questions could inform researchers, practitioners, and policy-makers alike regarding the influences of Agricultural Education on contributing to the needs of American society to produce that quality workforce and involved citizenry.

Purpose

The purpose of this research was to determine the factors associated with teaching and learning in Agricultural Education that impact student' academic and leadership abilities. To guide the overall purpose, the following objectives are proposed.

Objectives
1. Determine the academic, applied academic, and levels of perceived leadership of students enrolled in secondary agriculture programs in the state of Illinois.
2. Compare academic levels of achievement between high school students enrolled and those not enrolled in high school agriculture programs.
3. Determine the relationships between students' academic, applied academic and perceived leadership abilities and selected student variables i.e. gender, perceived leadership, involvement in SAE, FFA involvement, etc.

Procedures:

The population for the study was 102 seniors in 5 secondary agriculture programs across western and west central Illinois. This study is considered an ex post facto study utilizing a static group comparison design. Ex post facto means that the treatment (involvement in the agriculture program) had already occurred and data were collected, "after the fact". The nature of the static group comparison was that the groups in the study were already intact. Two groups of students formed the independent variable in the study: agriculture students and non-agriculture students respectively. A matched pairs method of selecting the group of non-agriculture students was utilized in an attempt to minimize between groups differences. The dependent variables in the study were, academic abilities (as measured by ACT composite and cumulative gpa), leadership abilities (as measured by 2 leadership subscales on an Illinois leadership inventory), and applied academic abilities (as measured by math and reading for information on the WorkKeys assessments). An alpha level of .05 was determined a priori for all statistical analyses.

Step 1: In order to secure IRB approval, research teams including the UIUC researcher and a graduate assistant, an FCAE field adviser, Mike Massie, the administration team, and the agriculture teacher from each respective high school met to discuss guidelines and procedures for the study.

Step 2: Once approval was secured, the guidance counselor and agriculture instructor determined the participants in the study. Agriculture students were seniors in the agriculture program, who had been consistently enrolled in the program, who were FFA members, and who maintained SAE record books of some nature for 3 consistent years prior to data collection. The agriculture students were then paired with a respective non-agriculture student as identified by a guidance counselor. All attempts were made to match each agriculture student to a non-agriculture student based upon gender and class rank.

Step 3: Once the participants were selected, the data collection procedures began. The high school guidance counselor provided information regarding students' gpa, ACT scores, WorkKeys assessments, and Prairie State Achievement exam scores.

Step 4: A questionnaire titled the Illinois Leadership assessment was administered to all participants. This instrument measures students' perceived leadership abilities in regard to 2 important factors, self-management (i.e. goal setting and other leadership tasks) and interpersonal relationship abilities (i.e. the ability to work with and lead others). This questionnaire had previously been pilot and field tested for reliability, as well as reviewed by an expert panel for face and content validity. Results for both leadership subscales, labeled L1 and L2 were then entered into the database.

Step 5: Data were analyzed utilizing descriptive statistics, independent samples t-tests, simple regression analyses, and ANOVA procedures.

Results, Interpretation, and Discussion

<u>Objective 1 and 2:</u> What are the academic, applied academic, and perceived leadership abilities of agriculture and non-agriculture students as well as the differences between them?

Table 1. Academic, Applied Academic, and Leadership Abilities			
Measure	<u>M</u> Ag	<u>M</u> Non-Agr	T-Test (sig)
ACT	18.55	19.38	.812
GPA	2.78	2.81	.861
WK Math	4.94	4.98	.182
WK Reading	4.76	4.74	.133
Leadership 1	3.80	3.87	.076
Leadership 2	4.73	4.92	.790

The results of Table 1 can be interpreted from both a practical and a statistical vantage point. In regard to the academic abilities of Agriculture and Non-agriculture students, the average ACT composite scores for both groups were approximately 19. In regard to performance on applied academic abilities, both groups performed at a 4.9 on the WorkKeys Math subscale and a 4.7 on the WorkKeys reading subscale. Skill levels of WorkKeys range from one to six, with six being the highest skill level toward which a student can perform in any applied academic area. Finally, in regard to leadership, students were asked to rate themselves on a 5 point Lickert-type scale. A score of 1 indicates that they strongly disagreed with the particular leadership statement and a score of 5 indicates that they strongly agreed with the leadership statement. The first leadership subscale consisted of statements in regard to how students set goals for themselves, visualize tasks, and then perform as an individual. The second leadership subscale indicated student perceptions of their ability to work with teams and/or lead others. Both agriculture and non-agriculture students perceived a moderate level of agreement with abilities to monitor themselves as individuals, and to lead groups.

There were no significant differences between students enrolled in agriculture programs and those not enrolled in agriculture programs in regard to their academic, applied academic, or leadership abilities. These results, however should be interpreted with caution. First, a sample of 51 pairs of students is not large enough to provide great power to any statistical tests. As such, the researchers could not definitively determine from the nature of this small sample size the direct influences enrollment in an agriculture program might have in regard to student leadership, academic, and applied academic abilities. Furthermore, anecdotal evidence suggests that the students in the pilot studies were from economically depressed schools in Western Illinois. As such, student enrollment in the agriculture programs comprises many at risk, low income, and special needs students. Furthermore, the literature suggests that students enrolled in agriculture and other CTE programs in schools comprise a population of lower ability students. The fact that agriculture students were performing as well as their non-agriculture counterparts in this study indicates some tentatively positive trends in which lower ability students might see positive growth in agriculture programs.

<u>Objective 3:</u> How can variances associated with leadership, academics, and applied academics be explained?

Table 2. Influences on Leadership Abilities

Measure	M (n=85)	R	Measure	M (n=85)	R
Leadership 1	3.84	1.00	Leadership 2	4.82	1.00
Ag-Non	NA	.05	Ag-Non	NA	.11
WK Math	5.06	.21*	WK Math	5.06	.22*
WK Reading	4.81	.12	WK Reading	4.81	.14
ACT	19.42	.22*	ACT	19.42	.26*

* significant, .05 alpha level

The study also attempted to discover student variables that could predict academic, applied academic, and leadership abilities respectively. Table 2 displays the correlation matrices of the variables that influenced student leadership abilities. The left side of the table are influences on Leadership 1 (individual goal-setting), and the right side of the table indicates student influences on Leadership 2 (leading others). In regard to leadership abilities, WorkKeys Math as well as ACT scores had statistically significant correlations with both leadership measures in this study. The researchers postulate that perhaps the analytical or problem solving abilities in which WorkKeys Math and ACT measure positively correlate with student perceptions of themselves as leaders. The opportunity in this finding is for agriculture programs to continue to strengthen problem solving and analytical abilities in their students.

The findings not reported in tabular format include analysis of variance procedures that were employed to determine factors that influence the academic abilities of students. In regard to academic abilities, PSAE reading and PSAE science explained a significant amount of variance of student ACT scores. This result is consistent with a number of academic studies that indicate that reading and science abilities positively correlate with ACT. The opportunity in this finding is that agriculture programs should focus on the academic areas of reading and science in regard to student development.

In regard to applied academic abilities, the models were not statistically significant predictors of student performance in those areas. It is again suggested that the sample size for this study be increased so that more definitive models could be tested with a degree of statistical power.