DOCUMENT RESUME

ED 287 005 CE 047 964

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TITLE The Academic Ability of Agricultural Education Graduates Compared with Other Agriculture, Education and University Graduates. Summary of Research 48.
INSTITUTION Ohio State Univ., Columbus. Dept. of Agricultural Education.
PUB DATE 87
NOTE 21p.
PUB TYPE Reports - Research/Technical (J43)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; *Agricultural Education; *College Graduates; Education Majors; Grade Point Average; Higher Education; *Preservice Teacher Education; Scores; Secondary Education; *Teacher Qualifications; Vocational Education; *Vocational Education Teachers
IDENTIFIERS Ohio State University

ABSTRACT

In light of recent suggestions that the quality of teachers is declining, a study attempted to determine if the academic ability of agricultural education graduates was significantly different from the academic ability of other agriculture, education, and university graduates. The study included four populations of Ohio State University graduates receiving four-year degrees between 1978 and 1983. Samples were taken of 105 agricultural education graduates, 160 agriculture graduates, 155 education majors, and 1,494 other bachelor's degree graduates. Data on the graduates were gathered from university records. Some of the results and conclusions of the study were as follows: (1) this study did not support the hypothesis suggested by other studies that agriculture education graduates ranked lower academically than other graduates; (2) agricultural education graduates earned scores on the English, mathematics, and composite portions of college entrance tests that were not significantly different from secondary education graduates; and (3) neither the high school percentile rank nor the high school grade point average earned by agricultural education graduates was significantly different from that earned by secondary education graduates, although the secondary education graduates did have higher scores in the humanities, social sciences, and specific content-area courses. The data clearly indicate that agricultural education graduates are as academically inclined as other education and university graduates. The study suggested that the lower esteem in which some professors hold agricultural education graduates implies an image problem that should be the concern of agricultural educators. (KC)

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SUMMARY OF RESEARCH

DEPARTMENT OF AGRICULTURAL EDUCATION

The Ohio State University
Columbus, Ohio 43210

THE ACADEMIC ABILITY OF AGRICULTURAL EDUCATION GRADUATES COMPARED WITH OTHER AGRICULTURE, EDUCATION AND UNIVERSITY GRADUATES

George Wardlow and Larry E. Miller

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INTRODUCTION

The issue of teacher competence has received much attention from those within as well as from those outside the education profession. Recent studies questioned the abilities of teachers and of those who aspire to teach. Colleges and universities are increasing minimum requirements for admission into teacher training programs and several states have implemented testing programs for teachers entering the profession.

The recent concern over the issue of teacher competence is not without precedent. In 1956 Whyte stated, "It is now well evident that a large proportion of the younger people who will one day be in charge of our secondary system are precisely those with the least aptitude for education of all Americans attending college." The Miseducation of American Teachers by Koerner issued a scathing indictment of teacher education in 1963. The

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last decade focused on selecting the most qualified teachers from an increasing supply of college graduates. Schlechty and Vance (1983) suggested that the apparent oversupply of college educated teacher candidates in that decade who were willing to teach, made teaching a selective occupation since schools could choose from among the candidates.

Historically, teachers have not been drawn from that segment of the population with greatest aptitude for academic ability. Studies completed between 1940 and 1960 consistently showed that students preparing to be teachers were less academically able than students preparing to enter other professions (Blum 1947; Burnett & MacMinn, 1966; Mitzel and Dubnick, 1961). Weaver (1979) as well as Vance and Schlechty (1982) indicated that teachers are still being drawn from the least academically able college students. Studies also indicated that of those who enter teaching, those who continue to teach are less academically able than those who do not continue to teach (Schlechty & Vance, 1981).

Critics of education and teacher education see these results as evidence that teacher quality is less than desirable, while defenders of the quality of teachers questioned the assumption that academic ability is an accurate and dependable indicator of teacher success. Researchers such as Ducharme (1970), Greaves (1972), and Ferguson (1977) found, however, that a positive relationship exists between academic ability and teacher competence. Specific measures of academic ability of the teacher, such as scores on verbal aptitude tests, have been associated with student achievement and researchers such as Schlechty and Vance (1981, 1983) and Weaver (1978, 1979, 1981) based their research on this assumption.

Schalock (1979) stated,

> Whatever else teaching may be, it is an intellectual enterprise. It presumes teachers to be knowledgeable and able to help others to become knowledgeable. It is not surprising therefore, that intelligence and academic ability have been looked to as likely predictors of success in teaching. (p.370)

Schlechty and Vance (1981) stated that it is generally accepted that persons who score well on measures of academic ability have educational and job opportunities available to them that are not usually available to those who score poorly. They suggested that prospective teachers who score well on measures of academic ability are more likely to choose careers other than teaching, either before entering the profession or shortly thereafter.

PURPOSE AND OBJECTIVES

In light of recent concern about the academic ability of teachers in general, the academic ability of teachers of vocational agriculture may also be in question. Are the most talented students in agriculture seeking

or being recruited to the teaching profession? Do the best students elect to seek other career opportunities? If a disproportionate number of teachers are being drawn from the bottom quarter of graduating high school and college classes, as the National Commission on Excellence in Education (1983) suggests, then the speculation is easily made that the quality of vocational agriculture programs will decline as the quality of teachers declines. Knowledge of the present academic status of entering teachers would aid the profession in making decisions regarding the recruitment and retention of teachers.

The purpose of this study was to determine if the academic ability of agricultural education graduates was significantly different from the academic ability of other agriculture, education and university graduates. The objectives of this study were based on accepted measures in specific areas of instruction common to all subjects in the study, and were:

1. Describe agricultural education graduates, other agriculture graduates, and secondary education graduates on their cummulative grade point average (GPA), high school GPA, high school percentile rank, ACT English scores, ACT mathematics scores, ACT composite scores, GPA in coursework in the humanities and social sciences, and GPA in coursework relative to the content area of their specialities.

2. Determine if significant differences existed between agricultural education graduates, other agriculture graduates, secondary education graduates, and all university graduates on cumulative GPA, high school GPA, high school percentile rank, ACT English scores, ACT mathematics scores, ACT composite scores, GPA in coursework in the humanities and social sciences, and GPA in coursework relative to the content area of their specialization.

Cumulative grade point average represented the numerical value of all grades earned while in college and was calculated on a four-point scale. High school grade point average represented the equivalent score for all grades earned while in high school. ACT scores were those scores earned on specified portions of the American College Testing Program's examination. Humanities and social science courses included coursework in which subjects enrolled to fulfill specific Ohio State University requirements. These courses were from specific pools of humanities and social science courses. Content area courses were those courses in which each subject enrolled to develop their technical expertise. An example of content area courses would be agriculture courses in which an agricultural education student enrolled.

PROCEDURES

Population and Sample

The study included four populations of Ohio State University graduates. Each received traditional four-year bachelor's degrees between the Summer Quarter of 1978 and the Spring Quarter of 1983. Three of the populations were stratified by year and a random sample drawn from each. Stratification was necessary to allow analyses not reported herein. The size of each sample was calculated using Cochran's (1977) formula for determining sample size.

The population of 249 agricultural education graduates was represented by a sample of 105 graduates with a Bachelor of Science degree in Agriculture and a major in agricultural education. The population of 2237 agriculture graduates was represented by a sample of 160 graduates with a Bachelor of Science degree in Agriculture and majors in areas other than agricultural education. A sample of 155 graduates with majors in the College of Education which culminated in secondary school teaching certificates represented the third population of 1338 secondary education graduates. The fourth population was comprised of all 1494 graduates of The Ohio State University who received bachelor's degrees during the period of interest. It should be noted that the first three populations were actually sub-populations of the university populations.

Data on the characteristics of interest were collected for each subject in the three sample groups from the records offices of the College of Agriculture and the College of Education. Data for the University population were obtained in the form of population statistics from the Office of Planning Studies to be used as comparison data.

DATA ANALYSIS

Descriptive statistics were used to address specific objectives of the study, and analysis of variance was utilized to determine if significant differences existed between sample groups. The alpha level was set a priori at .05 and the Scheffe' post hoc procedure was utilized. To compare the population with the sample, 95 percent confidence intervals were constructed around the sample means. These means were then compared with the population means to determine if the population means were within the upper and lower limits of the confidence intervals.

Because this study was descriptive in nature, it sought only to describe rather than to explain relationships between characteristics. The data were obtained from graduates of The Ohio State University between and including the Summer Quarter of 1978 and Spring Quarter of 1983. The generalizability of the results is limited on that basis. Because data were obtained for all subjects, non-response error was not considered a problem. The 95 percent confidence intervals were used to alleviate potential errors inherent in comparing sub-populations with a larger population.

FINDINGS

Cumulative Grade Point Average

Secondary education graduates held significantly higher cummulative grade point averages than either agricultural education or other agriculture graduates. As shown in Table 1, the secondary education sample earned a mean grade point average of 2.96 while agricultural education graduates had a 2.81 and other agriculture graduates 2.71. No significant difference existed between the agricultural education and other agriculture groups.

The mean grade point average for the university population was 2.87. When mean values for the samples were compared with the population, only agricultural education graduates were not significantly different from the population. Other agriculture graduates had significantly lower grade point averages than university graduates. Secondary education graduates had significantly higher cumulative averages (Table 2).

High School Percentile Rank

No significant differences were found among the sample groups on the variable high school percentile rank (Table 3). When 95 percent confidence intervals were constructed around the sample means, none were found to differ significantly from the university population (Table 4).

High School Grade Point Average

The analysis of high school grade point averages found no significant differences between the sample groups. Data were not available for the university population on this variable (Table 5).

Grade Point Average in Humanities Courses

Secondary education graduates were found to hold significantly higher grade point averages in courses in the humanities than either agricultural education graduates or other agriculture graduates. No significant difference was found between agricultural education graduates and other agriculture graduates. Secondary education graduates earned a 2.96 mean grade while agricultural education graduates earned a 2.74 and other agricultural graduates a 2.80 in these courses. These data are shown on Table 6. Data were not available for the university population on this variable.

Social Science Grade Point Average

Secondary education graduates earned a mean grade average in social science courses which was significantly higher than that of agricultural education graduates. Other agriculture graduates were not significantly different from either agricultural education or secondary education graduates on this variable. Table 7 illustrates that secondary education grad-

Table 1
Analysis of Variance of Cumulative Grade Point Average by Group

	Grade Point Average		
	Agricultural Education	Other Agriculture	Secondary Education
n	105	160	155
Mean	2.81	2.71	2.96
S.D.	.440	.459	.423

Source	df	SS	MS	F
Between Groups	2	4.74	2.37	12.14 *
Within Groups	417	81.49	0.19	
Total	419	86.24		

*Significant at =.05
- - - Means are significantly different

Table 2
Comparison of University Graduates with Agricultural Education, Other Agriculture and Secondary Education Graduates on Cumulative Grade Point Average

Group	n	Cumulative GPA Mean	S.D.	95% Confidence Interval
University		2.87	.48	
Agricultural Education	105	2.81	.44	2.72 to 2.89
Other Agriculture	160	2.72	.46	2.65 to 2.79*
Secondary Education	155	2.96	.42	2.89 to 3.06*

*Significantly different from University mean

Table 3
Analysis of Variance of High School Percentile Rank by Group

	Grade Point Average		
	Agricultural Education	Other Agriculture	Secondary Education
n	105	158[a]	140[b]
Mean	78.45	74.87	74.85
S.D.	16.87	17.77	20.04

Source	df	SS	MS	F
Between Groups	2	997.80	498.90	1.478
Within Groups	400	135012.12	337.53	
Total	402	136009.92		

=.05
a = 2 missing values
b = 15 missing values

Table 4
Comparison of University Graduates with Agricultural Education, Other Agriculture and Secondary Education Graduates on High School Percentile Rank

Group	n	Cumulative GPA Mean	S.D.	95% Confidence Interval
University	-	76.12	20.50	
Agricultural Education	105	78.45	16.87	75.18 to 81.71
Other Agriculture	158	74.87	17.77	72.08 to 77.64
Secondary Education	140	74.85	20.04	71.50 to 78.20

Table 5
Analysis of Variance of High School Grade Point Average by Group

	Grade Point Average		
	Agricultural Education	Other Agriculture	Secondary Education
n	105	160	133[a]
Mean	3.20	3.11	3.13
S.D.	.466	.491	.553

Source	df	SS	MS	F
Between Groups	2	0.53	0.26	1.033
Within Groups	395	101.31	0.26	
Total	397	101.84		

=.05
a = 22 missing values

Table 6
Analysis of Variance of Humanities Grade Point Average by Group

	Grade Point Average		
	Agricultural Education	Other Agriculture	Secondary Education
n	105	160	154[a]
Mean	2.74	2.80	2.96
S.D.	0.60	0.77	0.62

Source	df	SS	MS	F
Between Groups	2	4.10	2.05	5.274 *
Within Groups	416	161.88	0.39	
Total	418	165.98		

*Significant at = .05

- - - - Means are significantly different

[a] = 1 missing value

Table 7
Analysis of Variance of Social Sciences Grade Point Average by Group

	Agricultural Education	Other Agriculture	Secondary Education
n	105	160	151[a]
Mean	2.54	2.66	2.76
	- - - -		- - - -
S.D.	0.68	0.64	0.65

Source	df	SS	MS	F	
Between Groups	2	3.09	1.54	3.608	*
Within Groups	413	176.63	0.43		
Total	415	179.72			

*Significant at = .05

- - - - Means are significantly different

[a] = 4 missing values

uates earned a 2.76 while other agriculture and agricultural education graduates earned 2.66 and 2.54 grade point average respectively. Data were not available for the university population on this variable.

Grade Point Average In Content-Related Courses

Secondary Education graduates earned a 3.01 mean grade average in courses related to their area of specialization. This was found to be significantly higher than the 2.76 average earned by agricultural education graduates, but not significantly different from the 2.87 average earned by other agriculture graduates. The grade point average of agricultural education graduates was not significantly different from that of other agriculture graduates. Data for the university population were not available on this variable (Table 8).

ACT English Scores

The analysis of variance performed on the sample groups found no significant differences among agricultural education, other agriculture or secondary education graduates on the variable ACT English scores (Table 9). However, when 95 percent confidence intervals were constructed around the means of each sample, the mean ACT English score held by the university population was found to be significantly higher than that of each sample (Table 10).

ACT Mathematics Scores

The mean scores made by the sample groups on the mathematics portion of the ACT were not found to be significantly different (Table 11). When 95 percent confidence intervals were constructed around these sample means, the agricultural educaiton and other agriculture graduates were not significantly different from the university population. Secondary education graduates however, had significantly lower mean scores than the university population (Table 12).

ACT Composite Score

ACT composite scores for the three sample groups were not significantly different (Table 13). When sample means were compared with the mean of the university population, agricultural education and other agriculture graduates were not significantly different from those of the university population. Secondary education graduates scored significantly lower than the university population did on this variable (Table 14).

CONCLUSIONS AND DISCUSSIONS

Previous evidence indicated that individuals who aspired to teach were less academically able than other college students (Weaver, 1979; Vance and Schlechty, 1982; National Commission on Excellence, 1983). This

Table 8
Analysis of Variance of Grade Point Average in Content-Related by Group

	Grade Point Average			
	Agricultural Education	Other Agriculture		Secondary Education
n	105	160		155
Mean	2.76	2.87		3.01
	- - - -			- - - -
S.D.	0.57	0.52		0.48

Source	df	SS	MS	F
Between Groups	2	3.99	1.99	7.506*
Within Groups	417	111.11	0.27	
Total	419	115.10		

*Significant at = .05

- - - - Means are significantly different

Table 9
Analysis of Variance of ACT English Score by Group

	Grade Point Average		
	Agricultural Education	Other Agriculture	Secondary Education
n	105	156[a]	136[b]
Mean	18.50	19.35	19.19
S.D.	5.02	4.29	4.14

Source	df	SS	MS	F
Between Groups	2	29.99	14.99	0.758
Within Groups	394	7789.69	14.77	
Total	396	7819.68		

= .05

[a] = 4 missing values

[b] = 19 missing values

Table 10
Comparison of University Graduates with Agricultural Education, Other Agriculture and Secondary Education Graduates on ACT English Score

Group	n	Cumulative GPA Mean	S.D.	95% Confidence Interval
University	-	20.09	4.49	
Agricultural Education	105	18.70	5.02	17.73 to 19.68*
Other Agriculture	156	19.35	4.29	18.67 to 20.03*
Secondary Education	136	19.29	4.14	18.59 to 19.99*

*Significantly different from University mean

Table 11
Analysis of Variance of ACT Math Score by Group

	Grade Point Average		
	Agricultural Education	Other Agriculture	Secondary Education
n	105	156[a]	136[b]
Mean	22.02	21.75	20.24
S.D.	6.43	6.55	6.98

Source	df	SS	MS	F
Between Groups	2	237.92	118.96	2.672
Within Groups	394	17538.20	44.51	
Total	396	1776.12		

= .05
[a] = 4 missing values
[b] = 19 missing values

Table 12
Comparison of University Graduates with Agricultural Education, Other Agriculture and Secondary Education Graduataes on ACT Math Score

Group	n	Cumulative GPA Mean	S.D.	95% Confidence Interval
University	-	22.54	6.52	
Agricultural Education	105	22.02	6.43	20.77 to 23.26
Other Agriculture	156	21.75	6.55	20.71 to 22.79
Secondary Education	136	20.24	6.98	19.06 to 21.43*

*Significantly different from University mean

Table 13
Analysis of Variance of ACT Composite Score by Group

	Grade Point Average		
	Agricultural Education	Other Agriculture	Secondary Education
n	105	156[a]	137[b]
Mean	21.33	21.72	20.96
S.D.	5.04	4.53	4.63

Source	df	SS	MS	F
Between Groups	2	42.39	21.19	0.958
Within Groups	395	8736.66	22.12	
Total	397	8779.05		

= .05
a = 4 missing values
b = 18 missing values

Table 14
Comparison of University Graduates with Agricultural Education, Other Agriculture and Secondary Education Graduates on ACT Composite Score

Group	n	Cumulative GPA Mean	S.D.	95% Confidence Interval
University	-	22.25	4.78	
Agricultural Education	105	21.33	5.04	20.36 to 22.31
Other Agriculture	156	21.72	4.53	21.00 to 22.43
Secondary Education	137	20.96	4.63	20.17 to 21.74*

*Significantly different from University mean

study did not support that evidence, particularly for agricultural education graduates when compared with other agriculture or university graduates. Had agricultural education graduates chosen another degree emphasis, most would likely have chosen another agriculture major rather than another secondary education major. The most meaningful comparisons may be made with this in mind.

Agricultural education graduates earned scores on the English, mathematics and composite portions of the ACT which were not significantly different from secondary education graduates. Neither the high school percentile rank nor the high school grade point average earned by agricultural education graduates was significantly different from that earned by secondary education graduates. Secondary education graduates did, however, earn significantly higher cumulative grade point averages and significantly higher averages in courses in the humanities, social sciences, and specific content areas.

Scores agricultural education graduates made on several accepted measures of academic ability tend to be not significantly different from those earned by all university graduates and other agriculture graduates. One exception was found on the variable ACT English score on which agricultural education graduates scored lower than university graduates. While this particular finding is consistent with previously determined evidence and commonly held belief, the remainder of the findings are not.

The data clearly indicate that agricultural education graduates are as academically inclined as are other agriculture and university graduates. Further, while they may not earn grades that are as high as secondary education graduates in course work while at the university, their performance in high school and their scores on the ACT are indications that they are as academically able as secondary education graduates to do so.

The reason for the grade disparity between agricultural education and secondary education graduates was not an objective of this study. It should be an objective for future study. Why do agricultural education graduates perform as well as other agriculture and university graduates on many measures of academic ability, but do not score as well as secondary education graduates on measures related to performance in collegiate course work?

Both secondary education and other agriculture graduates were in degree programs which allowed them to accumulate higher proportions of their programs in content areas of specialization. For example, animal science graduates concentrated their studies in animal science courses and social science education graduates concentrated their studies in social science courses. Agricultural education graduates were unable to concentrate courses in any of the areas such as the humanities, social sciences, or an agricultural area because their program is more general in nature. Differences in requirements for various majors may have placed agricultural education graduates at a disadvantage because they did not have the opportunity to develop an equal expertise, and consequently a corresponding grade average, similar to that of their counterparts in other majors.

A study by Miller (1984) found that faculty in the College of Agriculture held agricultural education majors in "lower regard" than other agriculture majors. These data indicate that they are equal in academic ability. Why does this perception exist, particularly when agricultural education and other agriculture graduates performed equally well in their content related course-work? This question implies a problem of image associated with the major which should be the concern of all agriculture educators.

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SUMMARY OF RESEARCH SERIES

There is a movement within the United States to develop teacher education programs which will prepare teachers to be at a higher professional level than has been true previously. Some universities are moving towards a 5-year program. A concern has been that the brightest college students have been choosing careers outside of education. This study was conducted to investigate the academic ability of education, agriculture, agricultural education, and univiersity graduates. This information should help in ascertaining the academic strength of persons perparing to teach vocational agritulture.

These authors are recognized for their scholarship in preparing this summary. Dr. George Wardlow is an Assistant Professor of Agricultural Education, University of Minnesota and Dr. Larry E. Miller is Professor of Agricultural Education, The Ohio State University. Special appreciation is due to Dr. Larry R. Arrington, Department of Agricultural and Extension Education, University of Florida; Dean Sutphin, Assistant Professor, Agricultural and Occupational Education, Cornell University; and Blannie E. Bowen, Associate Professor, Agricultural Education, The Ohio State University, for their cricital review of this manscript prior to its publication.

Research has been an important function of the Department of Agricultural Education since it was established in 1917. Research conducted by the Department has generally been in the form of graduate theses, staff studies and funded research. It is the purpose of this series to make useful knowledge from such research available to practitioners in the profession. Individuals desiring additional information on this topic should examine the references cited.

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