FACTORS IDENTIFIED WHEN SELECTING A MAJOR IN AGRICULTURE

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Abstract

Student recruitment has a vital role in successful colleges of agriculture. The study investigated factors that influence students' decision to select a major within available agricultural disciplines. The population was full-time college students majoring in an agricultural discipline. The results provide a demographic profile of students, data on their perceived sources of influence and considerations when selecting an agriculture major. One factor, prior experience in agriculture, was identified as the relatively most influential source, whereas working outdoors was identified as the strongest consideration for selecting an agriculture major.

Introduction

Colleges of agriculture across the United States have seen a decline in enrollment during the past years (Donnermeyer & Kreps, 1994; Jackman & Smick-Attisano, 1992; Mallory & Sommer, 1986; National Research Council, 1988; Schuster & Costantino, 1986). Concern about the substantial decline in agriculture student numbers has been significant, and much research has been devoted to identifying and addressing the problem. Based upon a national supply and demand study, Goecker, Whatley, and Gilmore (1999) projected the average annual employment openings for qualified graduates in the U.S. food, agriculture, and natural resources system will be 57,785 during 2000-2005". At the same time, only 57,175 qualified graduates are expected to be available each year (Goecker, Whatley, & Gilmore, 1999). Coinciding with the decline in enrollment is a change in the demographics of agricultural professions. Agricultural occupations such as production have been most affected because of the changes in the food and agriculture system. The food and agriculture system has developed into a wider array of occupations reflecting public expectations. The modern food and agricultural system encompasses not only primary production, processing, marketing, and retailing, but also natural resources and the environment, human communities and their well being, and consumer health, safety, and ethics (Kunkel, Maw, & Skaggs, 1996, National Research Council, 1996).

Further, the National Research Council (1996) stated that the modern U.S. food and agriculture system is large, complex, diverse, and dynamic, and colleges of agriculture should reflect these contemporary changes. Goecker, Whatley, and Gilmore (1999) cited that colleges and universities must continue to strengthen educational programs to produce graduates who can address the problems to be solved in the 21st century. Moreover, Goecker, Whatley, and Gilmore (1999, p. 18) claim that "much greater efforts will be required to attract sufficient numbers of outstanding students to prepare for very challenging careers in the world's food, agricultural and natural resources system". How can colleges of agriculture encourage, recruit, and educate new agricultural scientists and professionals for today's dynamic world?

Conceptual Framework

A national interest is to maintain high-quality undergraduate and graduate teaching programs to attract the best and brightest students. Colleges of agriculture are challenged to seek new and innovative ways to appeal to potential students. Recruitment begins with identifying the various student populations and discovering what has the greatest influence on their decision to select an agriculture major.

A review of literature identified several sources that are considered influential in selecting an agriculture major. The sources of influence have been grouped into five principal factors. The five principal factors of influence included 1) exposure to agriculture, 2) family and friends, 3) college of agriculture recruitment activities, 4) professionals and 5) job considerations.

The sources of influence related to exposure to agriculture included prior experiences, relatives in agricultural work, radio broadcasts, TV programs, and literature (Schuster & Costantino, 1986). Donnermeyer and Kreps (1994) found that students already exposed to agriculture tended to enroll in agriculture majors more often than students without exposure. Similarly, family and friends of students have been considered an influential factor in choosing an agriculture major. Parents with an agriculture background, more often than not, have a significant impact on a student's choice in attending an agriculture college (Donnermeyer & Kreps, 1994; Schuster & Costantino, 1986). However, family members have a mixed effect on students' decisions. The family generally influences students to go to college, but does not necessarily help select a major (Jackman & Smick-Attisano, 1992). Family role models, however, were found to influence students' career decisions (Fisher & Griggs, 1995).

Persons in colleges of agriculture design and facilitate recruitment strategies to introduce the variety of available agriculture majors to students who have not been exposed before to such majors (Rawls, 1995). Other college related sources of influence that affects students' decisions to select a major in agriculture is the reputation of the college and faculty, facilities available, geographical location, cost of tuition, and financial incentive in form of scholarships (Donnermeyer & Kreps, 1994).

High school professionals have a definite role and responsibility to expose students to the many career opportunities (Fisher & Griggs, 1995). School teachers and counselors provide guidance and structure to help students select a positive career goal(s). However, in several studies, students reported that high school teachers and counselors do not encourage students to choose agriculture majors (Jackman & Smick-Attisano, 1992; Mallory & Sommer, 1986; National Research Council, 1988).

Job considerations also impact students' choice of major. Such considerations include the nature of the work (i.e., working out doors, working with people and/or animals), availability and location of job, income after college, and prestige of career area (Rawls, Martin, Negatu, & Robertson, 1994).

Based on the literature, there appears to be an assortment of factors that influence students' decisions to select a major in a college of agriculture. While no single factor may influence a student's choice of major, investigating the variables that most influence students can help in developing effective recruitment strategies and programs for attracting students into agricultural education and the various majors in the college of agriculture in order to meet the increasing demands of the agricultural employment market.

Purpose and Objectives

The purpose of this study was to determine the degree of influence selected factors had on students' choice of agriculture major. The following objectives were identified to accomplish the stated purpose:

1. To describe students majoring in an agricultural discipline by demographic (gender, age, ethnicity, community of origin, classification level) characteristics.
2. To describe the sources that most influenced students' choice of agricultural major.
3. To describe the sources that least influenced students' choice of agricultural major.

Methods

The target population for the descriptive study was full-time students pursuing a baccalaureate degree in an agriculture major at New Mexico State University during the spring semester. The frame for the study was intact groups in all (N=26) lower division (100-299) agriculture courses offered by the College of Agriculture and Home Economics in the Spring Schedule of

Classes. Lower division courses were selected to increase the likelihood of obtaining students from all four classifications (Freshmen, Sophomores, Juniors, & Seniors). Of the courses offered, 50% (n=13) of the courses were randomly selected for the study.

Data were collected using a questionnaire developed by the researchers. The questionnaire was designed to gather data on the five principal factors influencing choice of major using a five-point Likert-type scale. A demographic section was developed to elicit information based on a review of literature.

The questionnaire was assessed for validity and reliability. A panel of five experts consisting of three faculty and two graduate students in the Department of Agricultural and Extension Education reviewed the questionnaire for face and content validity. Comments and input offered by the panel were incorporated into the questionnaire. To ascertain the reliability of the questionnaire, a pilot test was administered to 25 college of agriculture students not targeted in the study. Given the nature of the questionnaire, a test-retest approach for assessing reliability was employed. A criterion percent of agreement for the test-retest results was set *a priori* at a minimum level of 75% agreement. Using a two-week time interval between test administrations, the resultant percent agreements ranged from 75% to 100% for items subject to reliability issues in the questionnaire. Because of the static nature of demographic data, reliability was not assessed on these items.

The data were collected by administering the questionnaires to students in the randomly selected agriculture courses. All instructors of selected courses approved and participated in the data collection. Uniform procedures were exercised for collecting data to control for potential bias or irregularities. During the data collection process, all students were allowed to complete the questionnaire, however, questionnaires from students not meeting the population description were purged from the study. A total of 115 (unduplicated) students participated in the study. No effort was made to seek out students absent from class at the time of the data collection. Thus, the nature of the responding sample limits the generalization of results to students who responded.

Response data were coded, entered into a personal computer, and analyzed using SPSS for Windows (Statistical Package for the Social Science 8.0). The following descriptive statistics were used to evaluate and describe the data: frequencies, percentages, means, and standard deviation.

Results

Demographic data were gathered to profile the respondents (Table 1). Slightly more than half of the respondents were males (53.9%), with females comprising 45.2% of the sample. The mean age of the respondents was 22 years, ranging from 18 to 39. The majority of the students (55%) grew up in towns or cities with populations greater than 5,000.

The majority of the respondents (54%) were upper division students (juniors or seniors) in college. Some of the students (38.3%) enrolled directly from high school into their agriculture major. Other students (23.5%) changed to their current major after being in college. The rest of the students either transferred from another post-secondary institution (19.1%) or returned to college after several years out of high school (13.9%).

The five principal factors investigated were 1) exposure to agriculture, 2) family and friends, 3) college of agriculture recruitment activities, 4) professionals, and 5) job considerations. Data for each of the principal factors are presented in tables two, three, four, five, and six respectively. Sub-items to each factor are illuminated if respondents' modal response for their perceived level of influence was "Very Influential" and/or had a mean ranking score of 3.0 or greater.

Table 1
Student Demographic and Academic Characteristics (n=115)

Characteristic	f	%	M	SD
Gender				
Male	62	53.9		
Female	52	45.2		
Missing Data	1	0.9		
Age[a]			22.1	4.10
Ethnicity				
White (Non-Hispanic)	60	52.2		
Hispanic	35	30.4		
More than one Ethnicity	11	9.6		
American Indian	6	5.2		
Asian	1	0.9		
Missing Data	2	1.7		
Community of Origin				
Small Farm/Ranch	22	19.1		
Rural Area, but not on a Farm or Ranch	12	10.4		
Small Town; < 5,000	15	13.0		
Small City or Suburb; 5,000 to 50,000	35	30.4		
Urban Area, City; > 50,000	28	24.3		
Missing Data	3	2.6		
Classification Level in College				
First-Semester Freshman	5	4.3		
Freshman	19	16.5		
Sophomore	29	25.2		
Junior	33	28.7		
Senior	29	25.2		

Note. [a]Range = 18 to 39; Mode = 21

Table 2 displays experiences related to exposure to agriculture and are arranged in descending order of influence. It was found that students perceive prior experience in agriculture (i.e., farm/ranch work, agriculture-related job), other agriculture experiences (i.e., FFA/4-H activities related to agriculture), and relatives in agriculture most influential to them when selecting an agricultural major. Each of these sources of influence have a modal category of "Very Influential" and a mean ranking score greater than 3.0. Conversely, items having a modal category of "Not Influential" were perceived by respondents to be not much of an influence in selecting a major in agriculture (Table 2). These items include high school agriculture courses and print/electronic media on or about agriculture (i.e., TV programs, journals, newspapers, magazines, and radio).

Table 2
Types of Exposure to Agriculture that Serve as an Influence when Selecting a Major (n=115)

	Level of Influence (%)[a]							
Exposure to Agriculture	N	S	Sw	Mo	V	N/A[b]	M[a]	SD
Prior Experience in Ag	17.5	1.0	13.4	17.5	50.5	15.7	3.8	1.50
Other Ag Experiences	21.5	5.1	12.7	12.7	48.1	20.9	3.6	1.62
Relatives in Agriculture	27.6	9.2	4.6	17.2	41.4	23.5	3.4	1.71
Ag Courses in High School	39.1	16.3	12.0	10.9	21.7	20.0	2.6	1.60
TV Programs about Ag	33.0	18.3	28.4	11.0	9.2	5.2	2.5	1.30
Technical Journals Focused on Agriculture	38.8	22.3	18.4	14.6	5.8	10.4	2.3	1.28
Newspapers about Ag	38.2	25.5	22.7	10.9	2.7	3.5	2.1	1.13
Non-Technical Magazines about Ag	41.5	22.6	21.7	10.4	3.8	7.8	2.1	1.18
Radio Broadcasts about Agriculture	60.4	21.7	16.0	1.9	0.0	7.0	1.6	0.83

Note.
[a]Based upon valid frequencies where N(Not)=1; S(Slightly)=2; Sw(Somewhat)=3; Mo(Moderately)=4; V(Very)=5
[b]N/A=Not Applicable; values represent the percent of individuals for whom the response item was not applicable.

Table 3 presents items representing Family and Friends as sources of influence in selecting a major in agriculture. Only one source, personal role model, had a mean ranking score greater than 3.0. However, respondents were polarized on their perception of this source as an influence. Approximately, 40% of the respondents indicated that a personal role model was "Not influential" in selecting an agricultural major, whereas, 39% indicated that a personal role model was "Very Influential" to them in selecting a major. The remaining items, Parent(s)/guardian(s), other relatives, college friend, high school friend, and sibling, yielded a "Not Influential" modal response from respondents.

Students' perceptions of college recruitment activities that influenced their decision in selecting an agricultural major are presented in Table 4. Only faculty's friendliness in their choice of major and the overall friendly atmosphere in the College of Agriculture were perceived to be influential in students' choice of major. Each generated a "Very Influential" modal response category and a mean ranking score greater than 3.0. The remaining items in Table 5 did not meet these criteria and thus were not considered to be influential in respondents' choice of major.

Table 3
Students' Perceptions of Family and Friends that Influence Selecting a Major (n=115)

	Level of Influence (%)[a]							
Family and Friends	N	S	Sw	Mo	V	N/A[b]	M[a]	SD
Personal Role Model	40.2	3.7	6.1	11.0	39.0	19.3	3.1	1.83
Parent(s)/Guardian(s)	29.8	16.7	17.5	15.8	20.2	0.9	2.8	1.52
Other Relatives	47.3	19.1	12.7	9.1	11.8	4.3	2.2	1.42
College Friend	52.3	8.4	15.9	15.9	7.5	6.9	2.2	1.41
High School Friend	53.7	11.1	16.7	11.1	7.4	6.0	2.1	1.35
Sister or Brother	57.3	14.6	14.6	8.7	4.9	10.4	1.9	1.23

Note.
[a]Based upon valid frequencies where N(Not)=1; S(Slightly)=2; Sw(Somewhat)=3; Mo(Moderately)=4; V(Very)=5
[b]N/A=Not Applicable; values represent the percent of individuals for whom the response item was not applicable.

These response items include, friendly atmosphere in the College of Agriculture, teaching reputation of a department, teaching reputation of the major's professors, teaching reputation of agriculture professors, informational pamphlets about the major, personal visit with a representative from the College, agricultural related clubs/activities, informational pamphlets about the College, scholarship(s) from a department, other financial incentives, a visit to the high school by a College representative, College alumni, recruitment receptions, and radio broadcasts about the College.

Table 4
Students' Perceptions of College Factors that Influence Selecting a Major (n=115)

	Level of Influence (%)[a]							
Sources of Influence	N	S	Sw	Mo	V	N/A[b]	M[a]	SD
Faculty's Friendliness in Department	15.2	9.8	20.5	26.1	27.0	2.6	3.4	1.39
Friendly Atmosphere in College of Agriculture	16.7	6.1	27.2	21.9	28.1	0.9	3.4	1.39
Teaching Reputation of Department	31.3	7.1	19.6	19.6	22.3	2.6	2.9	1.56

Table Continues

Table 4 (Continued)

Sources of Influence	Level of Influence (%)[a] N	S	Sw	Mo	V	N/A[b]	M[a]	SD
Teaching Reputation of Major's Professors	31.3	9.8	18.8	15.2	25.0	2.6	2.9	1.59
Teaching Reputation of Ag Professors	32.7	10.9	19.1	20.0	17.3	4.3	2.8	1.51
Informational Pamphlets about Major	30.3	15.6	18.3	23.9	11.9	5.2	2.7	1.42
Personal Visit with a Representative from College of Agriculture	41.9	9.7	15.1	17.2	16.1	18.3	2.6	1.56
Agricultural Related Clubs/Activities	45.2	8.7	10.6	19.2	16.3	9.7	2.5	1.60
Informational Pamphlets about College of Ag	39.1	14.5	24.5	12.7	9.1	4.3	2.4	1.35
Scholarship(s) from Department	61.9	12.4	7.2	6.2	12.4	15.7	1.9	1.44
Other Financial Incentives	63.4	9.8	8.5	9.8	8.5	26.1	1.9	1.38

Given a choice of career professionals (Table 5), professionals in agriculture fields were identified most frequently as "Very Influential" in selecting an agricultural major yielding a mean rank score of 3.3. Professionals whose mean rank score were less than 3.0 and whose modal response category was "Not Influential" in selecting an agricultural major were Extension professionals, high school science teacher, vocational agriculture teacher, other high school teachers, high school counselor, and high school principal.

Table 5
Students' Perceptions of Professionals' Influence in Selecting a Major (n=115)

Professional	Level of Influence (%)[a] N	S	So	Mo	V	N/A[b]	M[a]	SD
Ag Professionals	25.7	5.7	12.4	22.9	33.3	8.7	3.3	1.60
Extension Professionals	53.4	12.5	6.8	9.1	18.2	23.5	2.3	1.60
High School Science Teacher	46.4	15.2	15.2	12.5	10.7	2.6	2.3	1.40

Table Continues

Table 5 (Continued)

Professional	Level of Influence (%)[a] N	S	So	Mo	V	N/A[b]	M[a]	SD
Vocational Ag Teacher	57.3	11.2	12.4	2.2	16.9	20.9	2.1	1.52
Other High School Teachers	61.0	8.6	15.2	7.6	7.6	8.7	1.9	1.33
High School Counselor	76.4	10.4	8.5	2.8	1.9	7.8	1.4	0.91
High School Principal	81.7	6.4	7.3	2.8	1.8	5.2	1.4	0.88

Note.
[a]Based upon valid frequencies where N(Not)=1; S(Slightly)=2; Sw(Somewhat)=3; Mo(Moderately)=4; V(Very)=5

[b]N/A=Not Applicable; values represent the percent of individuals for whom the response item was not applicable.

The most influential job considerations (Table 6) when selecting a major as perceived by respondents were opportunities to work outdoors, do field work, work with animals, location of career opportunities, future job market, and working with people and/or plants. The modal category for the level of consideration for each of these items was "High"; each having a mean ranking score greater than 3.0. Potential income gained after college generated "Somewhat" to "Moderate" considerations from respondents. However, respondents did not perceive the prestige of the career area as a consideration for selecting a major.

Table 6
Job Considerations Students' Perceive as Influential in Selecting a Major (n=115)

Job Consideration	Level of Consideration (%)[a] N	S	So	Mo	H	M[a]	SD
Working Outdoors	3.5	0.9	6.1	17.4	72.2	4.5	0.92
Field (out-of-office) Work	4.3	0.9	10.4	18.3	66.1	4.4	1.02
Working with Animals	18.3	3.5	11.3	14.8	52.2	3.8	1.55
Location of Career Opportunities	7.0	8.7	23.5	24.3	36.5	3.7	1.23
Future Job Market of the Career Area	3.5	10.4	32.2	27.0	27.0	3.6	1.10
Working with People	4.3	10.4	33.9	25.2	26.1	3.6	1.12

Table Continues

Table 6 (Continued)

Job Consideration	Level of Consideration (%)[a] N	S	So	Mo	H	M[a]	SD
Working with Plants	21.7	9.6	20.9	17.4	30.4	3.3	1.52
Potential Income Gained after College	9.6	20.0	26.1	27.8	16.5	3.2	1.22
Prestige of Career	27.0	16.5	38.3	8.7	9.6	2.6	1.24

Note. [a]N(Not)=1; S(Slight)=2; So(Some)=3; Mo(Moderate)=4; H(High)=5

Conclusions, Recommendations & Implications

There is a myriad of sources that influence students' choice of academic major in agriculture. These data direct attention to sources that are very influential in this process. The data also identify sources that are not perceived to be very influential in students' choice of major. When compared to the selected sources of influence, "prior experiences" in agriculture was the highest ranked influence for selecting an agriculture major. This finding supports Donnermeyer and Kreps (1994), who found that Ohio State University students also were influenced by prior experience in agriculture. Having other experiences in agriculture through 4-H or the FFA Organization, or being associated with relatives who are involved in agriculture also surfaced as experiences that influence students choice of major.

It is further concluded that the friendliness of a departmental faculty and the overall friendly atmosphere in the College of Agriculture lead to selecting a career area in agriculture. Persons who also influence students' decision in selecting a major in an agricultural career area were professionals employed in agriculture and personal role models. Additionally, job considerations influence students' choice of major. Students consider working outdoors and out-of-office field work most influential. Other important considerations were working with animals, future job market, and location of employment opportunities. These findings also have been found important to other agriculture students and are supported by Rawls, Martin, Negatu, and Robertson (1994).

These data provide a basis for developing recruitment guidelines as faculty in agricultural education and others who seek to boost enrollment. Many students who choose a major in agriculture have prior experience and knowledge about agriculture. These students may have been exposed to some type of agriculture experience such as living on a farm or ranch, being involved with FFA and 4-H, hunting, and working with animals. To increase enrollment, recruitment needs to continue focusing efforts on students who have had these and related agriculture experiences.

Perhaps more challenging, however, is to recruit students who have not been exposed to or had prior agriculture experiences. The challenge is to increase these students' knowledge and awareness level about employment opportunities in agriculture. This may be accomplished by promoting existing agriculture literacy programs that target youth at various levels. Among others, such programs include Agriculture in the Classroom, Food for America, and Cow Belles.

The National Research Council (1996) estimates a shortage of qualified persons to fill positions in the modern U.S. food and agriculture system. To attract students to agriculture, as youth enter high school, they should be made aware of the various and numerous opportunities in agriculture by implementing career fair presentations to the general student body. Participants should include professionals in diverse areas of agriculture and representatives from the various departments in colleges of

agriculture. Additionally, school-to-work programs should be incorporated that allow students to participate in experiential activities related to agriculture career interests.

With a shortage of professionals in agricultural education, faculty in agricultural education should actively promote and participate in these activities. As such, faculty should communicate to students the job considerations related to various career choices in agricultural education.

While the results of this research are unique to this University, these data also offer implications for general recruitment efforts. These data may have importance at the state or national level for recruiting high school students into agricultural education and colleges of agriculture. Also, although the information presented is specific to agricultural career interests, persons involved in recruitment efforts in other areas may also use these findings as a guide for developing and implementing related activities.

Furthermore, the study provided useful information on basic factors that influence a student into choosing a major in agriculture, but also provide useful information on items that do not appear to influence students' decision on a career choice. Consumers of these findings should evaluate these data for effectiveness in their recruitment efforts. Moreover, this study provides a baseline of data that may contribute to future recruiting decisions and provide information for further research in this area.

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