

Factors Influencing Enrollment in Colleges of Agriculture: Perspectives of Students in 1862 Land Grant Institutions

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Abstract

The purpose of this study was to describe and identify factors that influence enrollment in colleges of agriculture at 1862 land grant institutions. The population of the study included students who were currently enrolled as students in the southern Cooperative Extension System region. A five-part instrument was developed to collect the data. The survey collected data regarding demographics and influencers on one's decisions to enroll in a college of agriculture or choose a career related to agriculture. Usable responses yielded a return rate of 76.2% respondents. Both descriptive and inferential statistics were used to analyze the data. Seventy-two percent of the respondents were females and 83.6% self-identified as white. A majority of total respondents grew up in suburban areas. Both males and females indicated that personal influences such as a parent, close relative or friends had a low influence on their decision to enroll in a college of agriculture. School related influences such as a high school counselor or an agriculture science teacher also had no or very low influence on their decision to enroll in a college of agriculture. Respondents who indicated having a family member involved in an agriculture career or lifestyle were most likely to be influenced by those closest to them when choosing to enroll in a college of agriculture. Given the findings from this study, it is recommended

that administrators in colleges of agriculture focus on educating prospective students, parents and high school personnel about the vast career opportunities available in agriculture and related fields. Future research should focus on identifying best practices and appropriate strategies for the recruitment and retention of students in colleges of agriculture in an effort to increase enrollment and eliminate perceived barriers to enrollment in a college of agriculture.

Introduction

Land grant colleges of agriculture have problems recruiting and retaining students for their programs. According to the Association of Public and Land Grant Universities (2014), enrollment in public universities has increased by 23 percent in the past decade. In the past, undergraduate and graduate students' enrollment in colleges of agriculture and related programs were declining (Gwynn and Thompson, 1990; Nichols et al, 1993; Scott and LaVergne, 2004). However, according to (U.S. Department of Education, National Center for Education Statistics, 2014), degrees conferred in the colleges of agriculture have been on a steady increase. Although enrollment has continued to increase, there remains a strain to meet the demands from industry for students in agricultural related fields.

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Land Grant colleges were established to teach agriculture and mechanical arts to “common” people. Justin Morrill was instrumental in the passage of the first Land Grant Act of 1862 which provided land for the establishment of colleges and universities to educate all of the American people (Molnar et al., 1981). Prior to the passage of the first Land Grant Act of 1862, higher education was limited to elite class individuals and traditionally only taught classical education. While this new legislation did not exclude the teachings of classical studies, it was heavily concentrated on agriculture and industrial type courses for skill development. University faculty and administrators were charged with identifying ways to increase the number of students enrolled in colleges of agriculture.

Hicks and Bruening (1991) stated that a shift in the workforce is calling for colleges to recruit a “new type of student” to their agricultural related programs. These new students are more likely to come from an urban area. The number of people residing in urban areas is increasing. This increase has impacted the type of student who currently enrolls in colleges of agriculture (Esters, 2007). Unlike the traditional college student, these students will come from a culturally diverse background, may not have grown up on a farm and furthermore, may have limited experience with agriculture (Esters, 2007).

Several researchers have identified factors that relate to students’ choice to enroll in colleges of agriculture (Jones and Larke, 2001; Robinson et al., 2007; Scanlon et al., 1989; Talbert and Larke, 1995; Wildman and Torres, 2001). The factors found in these studies include: influential people, images of agriculture and exposure to agriculture as children. While a plethora of research has focused on why students enroll in colleges of agriculture, more research is needed on the factors that influence enrollment.

Agricultural education is only one segment of the big picture in terms of agriculture and related programs—only about six percent of the student population is being served by this area (FFA Advisors, 2007). Many argue that a strong agriculture industry is pivotal to this country’s survival (FFA Advisors, 2007). Additionally, FFA Advisors (2007) stated, “a strong U.S. agriculture industry is vital to the health, safety and prosperity of this country” (p.7).

The conceptual model identified in this study is a model of student college choice (Chapman, 1981). This model specifies imperative variable sets and their interrelationships. This model suggests that to understand the choice of a potential student, it is imperative that background and current characteristics of the student, family characteristics and characteristics of the college should be taken into consideration. According to Chapman (1981) the external influences can be grouped into (1) the influence of significant persons, (2) the fixed characteristics of the institutions and (3) the institutions’ own efforts to communicate with prospective students. Chapman (1981) further

contends that external influences are generalized by the expectations of college life.

Purpose and Objectives

The purpose of this study was to identify and describe factors that influence enrollment in colleges of agriculture by currently enrolled students in colleges of agriculture at 1862 Land Grant institutions.

The specific research questions guiding this study were:

- To identify the demographic characteristics of students enrolled in colleges of agriculture at 1862 Land Grant institutions
- To determine who influences a student’s decision to enroll in a college of agriculture or choose a career related to agriculture

Procedures

The research questions were addressed using a descriptive correlation design. According to Radhakrishna et al. (2007), the goal of a descriptive correlation research study is to explain and/or predict relationships. The population for this study consisted of currently enrolled undergraduate and graduate students in 1862 Land Grant institutions during the fall semester of 2008. The sample for this study was selected using both cluster sampling and simple random sampling techniques. The researchers used the Cooperative Extension System’s regions as a means to identify an appropriate sample size. One institution was removed from the possible sample list because there was no active college/division/program of agriculture. After identifying all eligible institutions, the total number of 1862 Land Grant institutions was 14 with colleges of agriculture in the Southern region. All enrollees in the college of agriculture at these institutions were randomly selected and surveyed. A questionnaire was developed and reviewed by a panel of experts that consisted of five faculty members and two graduate students in the Department of Agricultural and Extension Education at The Pennsylvania State University. This panel established content and face validity. The initial instrument was revised based upon the comments and suggestions of the panel members. The final survey instrument and cover letters were reviewed and approved by the Office of Research Protections prior to the collection of data.

According to Dillman (2007), data should be collected in several phases. Data collection began with a pre-notice email to selected institutions requesting help with the study. This email also described the study and detailed the usefulness of the study as a means to provide a positive impression of the research (Dillman, 2007). Dillman also stated that pre-notification will help to increase response rate for surveys. Consequently, the initial contact requested that an email be sent to the researcher with an agreement to participate in the study. The second contact was approximately one week later in the form of an email to the institutions that

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agreed to participate. The text for the email sent to their students included a URL link to the questionnaire. This URL link was included in the follow-up contact. Another follow-up email, with a URL link, was sent to cooperating institutions 7-10 days later requesting that an email reminder be sent to students as well as thanking those students who had already completed the questionnaire. The fourth contact was an email sent with the URL link to the survey requesting that institutions send the email and survey information to their students.

Data Analysis

The completed questionnaires were coded, entered and analyzed using the Statistical Package for the Social Sciences (SPSS version 16.0) for Windows. Because the participants were selected at random, both descriptive and inferential statistics were used to analyze the data. Descriptive statistics included frequency distributions, means and standard deviations. The research questions were further analyzed by employing independent samples t-tests for the independent variables gender, race/ethnicity and family involvement in agriculture. One-way analysis of variance (ANOVA) was used to compare mean scores of scales computed by factor analysis for residence before college (rural/farm; rural/non-farm; suburban; urban). A rural area is an area that has citizens fewer than 2,500 and an urban area is comprised of 50,000 or more people (U.S. Census Bureau). A suburban area is a community that can be considered a distance that a person is able to commute from a larger city or town.

The Cronbach's alpha for the major subsections of the instrument was acceptable. The Chronbach's alpha for the Knowledge of agriculture related programs was 0.90. The usable response rate for this study was 76.2%. To address non-response bias, a comparison was made between early and late respondents (Miller and Smith, 1983) on the dependent variables. Early respondents were defined as those respondents who responded within the first contact and late respondents were classified as those who responded after the first contact. There were no significant differences on the variables tested.

Results

The majority of the respondents for the study were female (72.2%), white (83.6%) and from a suburban background. These particular demographic characteristics were similar to what other research studies found with regards to survey respondents currently enrolled in colleges of agriculture across the United States (Dyer et al., 1999; Williams, 2007). Family involvement in agriculture was about even for the respondents with 52.8% responding "no" that they did not have family members involved in an agriculture career or lifestyle and 47.2% indicating "yes" that they did have someone in their family involved in agriculture. The majority of respondents reported being 18-22 years old (67.1%). Most of

the respondents reported being upper level undergraduates (juniors and seniors) or graduate students, 50.5% and 20.6% respectively.

Students responded to variables about degree of influence various individuals had on their decision to enroll in a college of agriculture. A factor analysis was run to identify scales for both influencers on enrollment and influencers on career choice. Exploratory factor analysis (EFA) was used (Darlington, 2009). This factor analysis allows for more workable subset of scales to use for data analysis purposes in addition to the ability to describe a larger number of variables in smaller sets.

Individuals who influence decision to enroll in a college of agriculture were subdivided into two scales based on the results of the factor analysis statistical test. Results from the factor analysis were "Personal Influencers" and "School Related Influencers." The variable "other" was eliminated for the purposes of data analysis because of the large number of missing data for that variable. A Cronbach's alpha was conducted on the scales; the alpha levels were: 0.77 for Personal Influencers and 0.67 for School Related Influencers.

Influences on decision to enroll in a college of agriculture or choose a career related to agriculture were analyzed using independent samples t-tests. The demographic characteristics used for analyses were: gender, race/ethnicity, family involvement in agriculture and residence before college.

Gender

Significant differences were found among males and females on personal influences ($t = 2.04$, $p < 0.042$) on one's decision to choose a career related to agriculture. The mean score for males was significantly higher ($M = 2.76$, $SD = 1.22$) than females ($M = 2.60$, $SD = 1.19$) on decision to choose a career related to agriculture from personal influences. However, there were no significant differences found between males ($M = 1.73$, $SD = 0.95$) and females ($M = 1.62$, $SD = 0.88$) for career choice related to agriculture upon school related influences.

Race/Ethnicity

There were significant differences found between whites and non-whites ($t = 4.36$, $p < 0.001$) for the decision to choose a career related to agriculture from personal influences. The mean score for whites was significantly higher ($M = 2.71$, $SD = 1.20$) than for non-whites ($M = 2.29$, $SD = 1.17$) regarding the respondents' decision to choose a career related to agriculture based upon personal influences. There were no differences in the mean scores for whites ($M = 1.65$, $SD = 0.90$) and non-whites ($M = 1.65$, $SD = 0.97$) regarding school related influences affecting their decision to choose a career related to agriculture.

Family Involvement in Agriculture

As shown in Table 1, significant differences were found on personal influences ($t = 11.61$, $p < 0.001$)

and school related influences ($t = 4.69, p < 0.001$) between those who indicated they had family involved in agriculture and those who responded “no” when asked if they had family members involved in agriculture. The mean score for “yes” respondents was significantly higher ($M = 3.04, SD = 1.16$) than “no” respondents ($M = 2.29, SD = 1.06$) for personal influences on decision to enroll in agriculture. Furthermore, the mean score for “yes” respondents was significantly higher ($M = 1.85, SD = 0.97$) than “no” respondents ($M = 1.60, SD = 0.83$)

for school related influences on decision to enroll in agriculture.

Residence before College

One-way analysis of variance (ANOVA) to determine if there were differences in influencers on the decisions to enroll by residence before college is shown in Table 2. The ANOVA results for residence before college differed significantly for personal influences as well as school related influences on the decision to enroll in agriculture. A significant difference was found between rural/farm and the other the residences ($F = 65.65, p < 0.001$) on personal influences on enrollment. Rural/farm residence was also significantly different from each of the other groups ($F = 23.83, p < 0.001$) on school related influences on decision to enroll. The Scheffé post hoc analysis test was used to determine the nature of the differences. Rural/farm residence ($M = 2.14, SD = 1.07$)

Table 1. Independent t Test Results for Influences on Enrollment in the College of Agriculture by Gender, Race/Ethnicity, and Family Involvement in Agriculture

Influence on Enrollment	n	Mean	SD	t	p
Gender:					
Personal Influences					
Male	319	2.78	1.17	2.20	.028*
Female	829	2.61	1.16		
Total	1,148				
School Related Influences					
Male	314	1.79	.96	1.56	.118
Female	817	1.69	.89		
Total	1,131				
Race/Ethnicity:					
Personal Influences					
White	953	2.73	1.17	4.96	.000**
Non-White	188	2.27	1.10		
Total	1,141				
School Related Influences					
White	939	1.72	.92	.216	.829
Non-White	185	1.70	.87		
Total	1,124				
Family Involvement in Agriculture:					
Personal Influences					
Yes	562	3.04	1.16	11.61	.000**
No	588	2.29	1.06		
Total	1,150				
School Related Influences					
Yes	550	1.85	.97	4.69	.000**
No	583	1.60	.83		
Total	1,133				

Note. Scale: 1= No Influence, 2= Very Low Influence, 3= Low Influence, 4= High Influence, and 5= Very High Influence. * $p < .01$, two tailed. ** $p < .001$, two tailed.

Table 2. Means, Standard Deviations and ANOVA Results for Influences on Enrollment in Agriculture

Influences on Enrollment	Residence prior to college	n	*Mean	SD	F	p
Personal Influences						
	Rural/Farm	236	3.50ab	1.14	65.65	.000
	Rural/Non-Farm	244	2.64ab	1.13		
	Suburban	467	2.36a	1.02		
	Urban	197	2.34a	1.09		
	Total	1,144	2.65	1.17		
School Related Influences						
	Rural/Farm	227	2.14a	1.07	23.83	.000
	Rural/Non-Farm	242	1.71a	.90		
	Suburban	462	1.55a	.78		
	Urban	197	1.62a	.83		
	Total	1,128	1.72	.91		

Note. *Means followed by the same letter differ significantly from each other as identified by the Scheffé post hoc analysis technique. Mean values Scale: 1= No Influence, 2= Very Low Influence, 3=Low Influence, 4= High Influence, and 5= Very High Influence.

Table 3. Reliability for Factor Analysis of Individuals who influence a student’s decision to select a career related to agriculture

Factors	Items on Questionnaire	Number of Items	Alpha
Personal Influencers	Parent, Other Family Member (Sibling, Aunt/Uncle, etc.), Friend	3	.808
School Related Influencers	High School Ag Teacher, High School Guidance Counselor, College Recruiter	3	.727

Table 4. Independent t Test Results for Influences on Career Choice in Agriculture by Gender, Race/Ethnicity and Family Involvement in Agriculture

Influence on Career Choice	n	Mean	SD	t	p
Gender:					
Personal Influences					
Male	321	2.76	1.22	2.04	.042*
Female	830	2.60	1.19		
Total	1,151				
School Related Influences					
Male	317	1.73	.95	1.74	.083
Female	820	1.62	.88		
Total	1,137				
Race/Ethnicity:					
Personal Influences					
White	958	2.71	1.20	4.36	.000**
Non-White	186	2.29	1.17		
Total	1,144				
School Related Influences					
White	943	1.65	.90	.06	.955
Non-White	187	1.65	.87		
Total	1,130				
Family Involvement in Agriculture:					
Personal Influences					
Yes	565	3.01	1.20	10.67	.000**
No	588	2.29	1.09		
Total	1,153				
School Related Influences					
Yes	556	1.79	.99	5.07	.000**
No	583	1.52	.79		
Total	1,139				

Note. Scale: 1= No Influence, 2= Very Low Influence, 3= Low Influence, 4= High Influence, and 5= Very High Influence. * $p < .01$, two tailed. ** $p < .001$, two tailed.

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Table 5. Means, Standard Deviations and ANOVA Results for Influences on Career Decision Related to Agriculture

Influences on Career Choice	Residence prior to college	n	*Mean	SD	F	p
Personal Influences						
	Rural/Farm	237	3.41ab	1.16	51.43	.000
	Rural/Non-Farm	245	2.65ab	1.12		
	Suburban	468	2.35ab	1.10		
	Urban	198	2.38a	1.16		
	Total	1,148	2.64	1.20		
School Related Influences						
	Rural/Farm	232	2.07a	1.09	25.56	.000
	Rural/Non-Farm	241	1.66a	.87		
	Suburban	466	1.47a	.72		
	Urban	195	1.57a	.88		
	Total	1,134	1.65a	.90		

Note. *Means followed by the same letter differ significantly from each other as identified by the Scheffé post hoc analysis technique.
Mean values Scale: 1= No Influence, 2= Very Low Influence, 3=Low Influence, 4= High Influence, and 5= Very High Influence.

differed significantly from rural/non-farm residence ($M = 2.64$, $SD = 1.13$), suburban residence ($M = 2.36$, $SD = 1.02$) and urban residence ($M = 2.34$, $SD = 1.09$).

The individuals Influencing Decision to Choose a Career Related to Agriculture is shown in Table 3. Students were asked to respond to variables about degree of influence various individuals had upon their decision to choose a career related to agriculture. A factor analysis was run to reduce the data to two scales: Personal and School Related. The same scales created for individuals who influence a students' decision to enroll in a college of agriculture were also identified for use on the influence of one's decision to choose a career related to agriculture. A Cronbach's alpha was run for this set of scales; the alpha level was acceptable at 0.81.

Table 5 indicates that significant differences were found between rural/farm and each of the other groups ($F = 25.56$, $p < 0.001$) on school related influences on one's decision to choose a career related to agriculture. The Scheffé post hoc analysis test was used to determine the nature of the differences among the groups. Rural/farm residence differed significantly ($M = 2.07$, $SD = 1.09$) from rural/non-farm residence ($M = 1.66$, $SD = 0.87$), suburban residence ($M = 1.47$, $SD = 0.72$) and urban residence ($M = 1.57$, $SD = 0.88$) on the decision to choose a career related to agriculture from school related influences.

Conclusions, Discussions and Implications

Findings revealed that students from 1862 Land Grant institutions in the Southern Cooperative Extension Region were primarily white and female, from suburban areas. This study revealed that, in fact, there are not a lot of "traditional" students (farm background) enrolling in colleges of agriculture, but there is an increase in the number of female students from non-farm backgrounds enrolling in colleges of agriculture. Family involvement in agriculture surprisingly did not have a huge impact on the way students perceived agriculture and the barriers associated with enrollment.

The level of influence certain individuals have on a student's decisions related to agriculture is not as pronounced in this study as in others. Esters (2003) found that parents had a high influence on a student's decision to choose a career/enroll in an agriculture related program. While respondents to this study indicated those individuals had either no or low influence on their decisions related to agriculture, whites were typically more influenced by personal influences than non-whites. Contrary to other studies, school related influences had little to no impact on decisions to enroll or choose a career related to agriculture for students in this study. Robinson et al. (2007) found that individuals were influenced quite a bit by school related things such as websites and graduates from the college. This conclusion supports the influence of significant persons as described by Chapman in the Model of Student College Choice (1981).

Additionally, the factors included in personal influences listed on the questionnaire were: parent, other family member (sibling, aunt/uncle, etc.), or friends. The factors related to school related influencers from the questionnaire were: high school agriculture teacher, high school guidance counselor and college recruiter. These findings are contrary to what Robinson et al. (2007) found. Their study found that a parent or guardian was most influential in a students' college decision process. Findings from this study revealed that males and females differed significantly on the level of influence personal influences had on their decision making process, while they agreed on the amount of influence school related influences had on their decision to enroll in a college of agriculture. This conclusion supports the influence of the fixed characteristics of the institution as described by Chapman in the Model of Student College Choice (1981).

Personal and school related influence factors were also compared by race/ethnicity, family involvement in agriculture and residence prior to college. Significant differences were found between white and non-whites ($t = 4.96$, $p < 0.001$) on personal influences, but there were no differences between the two on school related influences. Currently, enrolled students who indicated they had a family member involved in agriculture differed significantly from those who said they did not have a family member involved in agriculture on both personal and school related influences factors. Significant differences were also found on personal and school related influences for respondents' residence prior to college.

Students enrolled in colleges of agriculture at 1862 land grant institutions indicated that their decision to choose a career related to agriculture was impacted by several individuals. On the personal influence factor scale, males differed significantly from females ($t = 2.04$, $p < 0.042$), while males ($M = 1.73$) and females ($M = 1.62$) did not differ significantly on their influence to choose a career based on school related influences factor. This finding is supported by Esters and Bowen

in a study conducted in 2005 found that parents and guardians were the most influential in their decision making to enroll in colleges of agriculture in an urban agricultural education program.

Respondents were compared based on race/ethnicity, family involvement in agriculture and residence prior to college. Whites and non-whites differed significantly on personal influences factor related to their decision to choose a career related to agriculture ($t = 4.36, p < 0.001$). Surprisingly, the findings suggest that whites ($M = 1.65$) and non-whites ($M = 1.65$) rated the level of influence of school related influences factor the same, “no influence” on their decision to choose a career related to agriculture. Significant differences were found between those indicating “yes” and “no” on whether or not they have a relative involved in agriculture on personal and school related influences. A one-way ANOVA found that students differed significantly by residence prior to college for both personal and school related influences factor. This conclusion supports the influence of significant persons and the fixed characteristics of the institution as described in the Model of Student College Choice by Chapman (1981).

The results of this study were unique to students enrolled in 1862 institutions from the southern region these findings present implications for all 1862 Land Grant institutions with colleges of agriculture. If colleges of agriculture are interested in increased enrollment, care should be taken to inform students, high school counselors and other people involved in students’ decisions to choose a career related to agriculture about the vast career and educational opportunities in the field. Recommendations for those concerned with increasing enrollment and stabilizing enrollment in colleges of agriculture include educating parents, other family members and friends, of potential students about the benefits of involvement in agriculture. If utilized, this proactive approach will support institutions’ own efforts to communicate with prospective students as described in the Model of Student College Choice by Chapman (1981).

Future research should include a qualitative approach to identify additional influencers as well as an in depth look to increase enrollment in agricultural programs.

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