

A FOLLOW-UP OF ANIMAL SCIENCE GRADUATES AT TEXAS A&M
UNIVERSITY, 1950–2010

A Thesis

by

ROBERT FRANK CAMPBELL

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE

August 2012

Major Subject: Agricultural Leadership, Education, and Communications

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ABSTRACT

A Follow-up of Animal Science Graduates at Texas A&M University, 1950–2010.

(August 2012)

Robert Frank Campbell, B.S., Texas A&M University

Chair of Advisory Committee: Dr. Gary E. Briers

Graduates from 1950 to 2010 with a B.S. degree in animal science from the Department of Animal Science of Texas A&M University were sent questionnaires by e-mail to collect information on how graduates of the department were being influenced in their career decisions by their educational experiences in the department and how they perceived selected components of the program. The questionnaire contained questions about their backgrounds and their careers. It also contained 23 statements to which respondents answered using a 5-point scale from strongly disagree to being strongly agree. Approximately 3,000 questionnaires were e-mailed, and 633 with full data were returned.

Male respondents were found to have more agricultural experience than females. Almost half of the males reported that they were in careers related to their animal science degree while slightly more than one-fourth of the females indicated animal science-related careers. Participants who were very experienced in agriculture prior to college were more likely to be in a career related to their animal science degree than were those with other levels of experience.

Participants responded with their levels of agreement to statements about their experiences in animal science courses. The statements with the highest level of agreement involved practical, hands-on and generic skills and attributes, industry involvement, and current issues in animal science. Graduates agreed that hands-on involvement with animals in courses and involvement with industry leaders were important. Similarly, they agreed that character, integrity, and work ethic were important attributes to develop in students. Communication skills—both oral and written—were highly important, too. On the other hand, graduates believed that the animal science curriculum did not emphasize creativity and did not provide enough flexibility to emphasize specialized areas of animal science such as companion animals.

Continual research about animal science graduates, their academic programs, and their careers is important to track the ever-changing demands and needs of the agricultural industry and of students.

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CHAPTER I

INTRODUCTION

A focus on career decisions and preparation has been a major thrust of the Department of Animal Science at Texas A&M University (TAMU). “As part of its land grant mission, the Animal Science Department strives to meet the needs of all citizens by providing outstanding teaching, research and extension programs” (Department of Animal Science, Texas A&M University, 2011, para. 2). To successfully enhance the amount of constructive participation by animal science students, educators must first examine the animal science curriculum.

One primary goal of all types of agricultural education should be to supply a well-trained workforce to the community (Conroy, 2000). The animal science program is a large contributor of graduates who do obtain careers directly in agriculture. By examining influencing factors for career choices among animal science graduates, researchers may determine why agriculture graduates pursue certain careers. By studying characteristics and backgrounds of students and examining their experiences—both before and during their educational program, researchers also may discover ways to improve learning experiences of students to increase the number of graduates who enter agricultural careers upon graduation.

This thesis follows the style of the *Journal of Agricultural Education*.

Statement of the Problem

A major concern of the Department of Animal Science of Texas A&M University is how animal science graduates are being influenced in their career decisions by their educational experiences in the department. This is a problem within all areas of agricultural study. Problems of initial entry into agricultural careers and also problems which relate to individuals who exit agriculture-related occupations have been a major focus of recent research in agricultural education departments (Esters & Bowen, 2005). This has been an increasing problem for recruiting graduates into agricultural fields in recent years, especially animal science.

This research study examined the views of animal science graduates on their education within the department. To ensure animal science graduates are benefiting from animal science courses, the animal science department decided to evaluate its curriculum in order to improve the level of education that will enhance students' chances and desires to enter an agriculture career upon graduation.

Purpose and Objectives

The purpose of this study was to evaluate animal science graduates from TAMU to determine what strengths and weaknesses those graduates felt about their experiences within the animal science curriculum and what factors of the animal science curriculum affected their career choices, if any.

The primary questions of this research were as follows:

1. What demographic, personal, and experiential/background attributes did graduates have upon entering the program in animal science?

2. Did graduates experience internships or graduate school as part of their educational program?
3. What were perceptions of animal science graduates of their educational experiences in the department?
4. What were the current employment situations of animal science graduates?
5. Were background characteristics and experiences related to their current employment situations?
6. Were background characteristics and experiences related to their perceptions of their educational experiences in animal science at Texas A&M University?
7. Were perceptions of animal science graduates of their educational experiences related to their current employment situations?

CHAPTER II

REVIEW OF LITERATURE

There have been many studies similar to this research done by other universities, as well as some by Texas A&M University. A study by Cleere, Minney, Murano, Briers, and Greathouse (2000) examined results of a survey of students and compared transfer students and non-transfer students at Texas A&M University. Transfer students were reported to have a GPR mean of 3.05 for hours completed at Texas A&M University while non-transfer students had an average GPR of 3.03. This information allows us to disregard whether a subject was a transfer student or non-transfer student in terms of decisions based on GPR. A question in the instrument asked if the graduates transferred into Texas A&M; this question was used to compare career decisions between non-transfer students and transfer students. The study also showed that transfer students and non-transfer students agreed that courses in animal science were valuable and not redundant (Cleere et al., 2000). Their research could be valuable when compared to the research reported here because many courses in the Department of Animal Science have the same course number, title, and description; some courses are currently taught by the same professors who taught them 15 or more years ago.

Goals within animal sciences have changed over time and should be monitored regularly by animal science educators. The primary goal of the animal science curriculum in the early 1900s was to produce farmers (Coffey, 1917). Coffey also believed strongly in the practical subjects, meaning courses in which students could learn the basic knowledge of a subject without going to school. These types of courses

may become more important again because of the transition from primarily rural students studying animal science to less agriculturally experienced, urban students enrolling in animal science. What may have been common sense 10 or 20 years ago may now be a new concept to animal science students. Buchanan (2008) suggested that the animal science curriculum would benefit by a change to accommodate the interests of the new urbanized population of animal science students without ignoring the desires of traditional students from farms and ranches.

During the last few decades the demographics have also changed considerably from almost exclusively all male, white students to now a majority of female students enrolled in the Department of Animal Science at Texas A&M and in animal science at other major universities. Miller et al. (2011) conducted a study to assess the critical thinking skills of students in the Department of Animal Sciences at the University of Florida (UF). Of 154 students surveyed, 67.5 percent were female and only 32.5 percent were male. Lyvers, Peffer, and Ottobre (2011) surveyed students who were enrolled in an introductory animal science course at Ohio State University. The survey revealed 77 percent female participants, and a majority of participants had a primary interest in companion animals and horses. Also, students who were enrolled in honors courses expressed no interest other than veterinary medicine as a career goal.

R. L. Edwards (1986) produced similar results from a study done on students enrolled in an introductory animal science course, Animal Science 107/108 at Texas A&M University. A majority of animal science majors (59%) listed veterinary medicine

as their career objective, and only 37 percent of animal science students indicated a farm background.

A person's background, personality, emotions, and interests play a crucial role in shaping his or her future plans and decisions (Lenarduzzi, Sheppard, & Slater, 2009). Natural differences among individuals may serve as an important link between deciding whether to pursue a certain career. One study asked veterinary students and veterinarians to rank possible influences on their decision to pursue a career in veterinarian medicine. The strongest influence for those asked was an experience working with a veterinarian and with animals (Ilgen et al., 2003). This study showed that most veterinarians as students had chosen this path of study based heavily on their background experiences dealing with veterinarians and animals instead of media-related material. As the number of small family farms decrease and agriculture continues to become more mechanized, the number of self-employed ranchers and farmers is also decreasing. There are still jobs available in the agriculture industry although employers may be major corporations. Among the questions still at hand are these: What, how, and why do individuals majoring in agricultural related degrees decide to choose a certain career path?

Gay (1938) found that, if freshman students are forced to take certain classes their first year or even first semester which do not apply to their major interests, they may get discouraged or lose interest in the animal science department. This means that the college has not met expectations of the student. Modification of the animal science curriculum is necessary to ensure that all students grasp the knowledge and skills needed to successfully apply those ideas and methods within a career directly related to animal

science, but a certain amount of flexibility within the curriculum may also be beneficial. Gay believed that students should have the opportunity to take some courses of personal interest throughout their college career to keep their fascination high within animal science. The curriculum and students must positively respond to one another (Kauffman, 1992). If animal science students lose interest in their major, they may be less likely to pursue a career directly related to their area of study after graduation.

Having agriculture-related graduates choosing career paths other than agriculture constitutes the validation of the next study. Jelinski, Campbell, Naylor, Lawson, and Derkzen (2008, February) compared influencing first career choices among 2006 graduates of the Western College of Veterinary Medicine. There were strong trends for graduates in food and animal-related careers who had parents and grandparents who were farmers. Results from this study showed that the desire to pursue agriculture-related careers may be greatly affiliated with the careers and livelihoods of past generations. With that in mind, how do educators influence individuals who do not have a family history in agriculture to pursue agriculture-related careers?

Because many individuals working directly in agriculture-related careers have a strong background or family ties dealing in agriculture, the Jelinski et al. (2008) study targeted individuals in agricultural education who were raised in an urban environment. Major influences of the urban graduates of agricultural education within the study were family members or close friends (Esters & Bowen, 2005). Overall, the mother or female guardian was the most common influence of the former students with friends being a close second. This information suggests that parents and friends play a crucial role of

influencing individuals in their career decision making. Knowing this type of information, researchers and educators should consider targeting parents to determine what and how to improve the overall perception of agriculture among them. In addition to targeting parents or influential individuals of students, researchers should also focus their attentions on the different learning styles and abilities of students. A large factor in maintaining student interest within a field of study is the ability of the students to comprehend the material being taught.

The tenth chapter of *The Adult Learner* suggests that instructors should adapt their instructions to accommodate the differences in individual abilities, styles, and preferences (Knowles, Holton, & Swanson, 2005). These are all important aspects to consider as an instructor. The better matched learners and instructors are, the more likely a higher level of learning will take place. This strategy can be effective regardless of the type of material being taught. A problem is getting instructors to consider the needs of individual learners. Students need to have the literary skills and public speaking skills to communicate and comprehend the new daily material (Orr, 1996). By obtaining these communication skills, students and graduates should become active participants within classes and later in agricultural decision making. Changing technologies and new innovations are a constant within animal science. Animal science graduates must be able to learn continually and research on their own to keep up with changes in agriculture.

With the growing concern of society about the new implications of the food supply and production technologies, it is important for animal science graduates to use critical thinking and communication skills to accurately describe the actions and intent

of the agricultural industry. Writing assignments can enhance student writing within animal science courses and not place a large amount of work on teaching faculty (Aaron, 1996). Writing assignments will aid in critical thinking and in communication skills. Critical thinking within the animal science curriculum is achieved if the uncertainty of scientific activity is acknowledged (Schillo, 1997). To successfully instill critical thinking skills in animal science students, teachers must become more of a facilitator and encourage discussions among students and students' questioning the reliability and validity of research. The adoption of critical thinking methods will enhance the education of students rather than indoctrinating them. Coorts (1987) stated that, to challenge students, faculty must be encouraged to review and upgrade their courses. Agriculture faculty must continually review curricula to provide an education that will meet the needs of students and the current agriculture job market. Smith (1989) emphasized that students can meet catalog requirements within a major and still be under-educated. Animal science graduates should be able to think critically to solve problems and effectively communicate and lead others. Courses in animal science should focus more on selection, evaluation, grading and/or judging to enhance students' decision-making abilities. Shann, Carr, and Berg (2006) evaluated students through the use of the Watson-Glaser Critical Thinking Appraisal (WGA) to quantify improvements in critical thinking ability of students enrolled in a Live Animal and Meat Evaluation course. The WGA was found to be an effective means to quantify the critical thinking of undergraduates in the survey. New grading and teaching styles should be taken into

consideration by educators to aid in evaluating the overall knowledge gained by students.

Many instructors cannot or will not change their teaching styles to help one student learn a certain concept (Shann, Carr, & Berg, 2006). Some instructors believe if the learner does not understand a topic from the material presented, it is the student's responsibility to figure out how to make sense of the material. If the overall goal of a department is to enhance knowledge and enthusiasm among students, then instructors should consider teaching methods that appeal more to students.

Characteristics of instructors can cause major impacts on the interests and willingness of students to learn. Roberts and Dyer (2004) assessed characteristics that students felt to be essential of an effective agriculture teacher. The survey found that effective planning, caring for students, communication, and morality were major characteristics that students thought made an effective agricultural teacher. Many variables must be considered when measuring the effectiveness of a teacher. If the learners are more self-directed, the instructor may benefit by allowing the group or individuals to teach themselves and have more individual responsibility for learning the material than keeping complete control of what must be taught. By knowing the characteristics that learners deem as essential for effective agriculture instructors, teachers can assess their individual teaching methods and adjust accordingly to the student's needs and abilities.

Meyer (1990) targeted alumni and current students of the University of California-Davis Animal Science Department. Surveys were mailed or done by

telephone to collect data on the views of individuals on the animal science curriculum and on their career choices and future plans. The study examined reasons individuals pursued animal science careers and also reasons some individuals changed their career paths overtime. Overall, a majority of participants who stayed in a field directly related to animal science were veterinarians or ranch owners, or they had a strong interest in animal science. A majority of participants who altered their career path away from animal science mainly had a change in interest. Participants in the research also listed courses that they considered to be very helpful in meeting their educational needs. Animal science, biological sciences, chemistry, and math were the most beneficial to participants. Reasons participants chose courses other than animal science were that the courses increased diversity of their career possibilities and personal development.

The issue of animal science graduates obtaining a career directly related to their field of study is not limited to the United States. The University of the Philippines Los Baños (UPLB) has been having decreased enrollment for agriculture related majors in recent years (Tuquero & Quimbo, 2008). Lack of interest is not the only reason for these declines of enrollment in agriculture majors but also the fact that half of BS agriculture graduates from UPLB from the years 2000 to 2005 were employed in non-agriculture related jobs. A similar study conducted at Central Luzon State University (Arango, n.d.) identified different factors to determine the readiness for employment of agriculture graduates at the university. Fifteen employers hiring agriculture graduates were interviewed regarding the employment competencies and skills important for them, and 95 fourth year students served as respondents to the questionnaire. There were eight

major factors agriculture employers were looking for when hiring; in order of average importance, these were as follows: communicating, managing people and tasks, crop production, entrepreneurial skills, managing self, livestock production, and mobilizing innovation and change. These results suggest that a larger majority of students would want to major in a field that focused on communication and management rather than some type of agriculture-related field.

At the Bunda College of Agriculture, the curriculum was originally set up to teach students what they needed to become agricultural extension workers who would assist small scale farmers (Mumba, 2006). As an increase in the need of industrialized agricultural positions increased, there was a greater desire for specialized fields and management courses by college students. Without having any skills or knowledge in commercial agriculture or management, graduates were at a disadvantage to obtaining a career within the industrialized agriculture sector. There was still a need for agriculture extension workers, so the college designed the curriculum to allow some options to become full degree programs to meet the needs of students seeking careers in commercialized agriculture. Constant revision of all agricultural-related curriculums—wherever the university may be—should be considered by faculty so as to keep current knowledge and skills available to students.

CHAPTER III

METHODS AND MATERIALS

Population and Sample

The population of baccalaureate degree recipients from the Department of Animal Science at Texas A&M University from 1950 to 2010 consisted of literally thousands of graduates (A. D. Herring, personal communication, May 7, 2012). From the Association of Former Students, faculty in the Department of Animal Science received a list of animal science graduates for whom the association had email addresses; this list comprised approximately 3,000 graduates. This list served as the sampling frame for the study. Rather than selecting a sample from this frame, the researcher used the entire frame as the sample for this research.

Instrument (Questionnaire Development)

A committee of faculty members in the Department of Animal Science at Texas A&M University was formed in 2009 to assess and review the current undergraduate curriculum. Members discussed their concerns about the curriculum and the career choices of graduates from animal science. Committee members then developed a set of questions which they believed would help decipher why animal science graduates were choosing the careers they were in and what factors as animal science majors affected graduates' career paths. All questions were considered and edited by the whole committee, and a questionnaire was developed for animal science graduates (see Appendix: Instrument).

The questionnaire consisted of yes/no questions and open-ended questions. The questionnaire also contained statements related to the quality and importance of the animal science program; participants responded to those statements using a 5-point scale of strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree.

Data Collection

Data were collected through an online survey; the data collection process ran for approximately seven weeks in July and August of 2010. More than 3,000 requests to participate in the evaluation of the animal science curriculum were e-mailed; the message contained an open link to the survey on the Texas A&M animal science website. Because the instrument was also available online to anyone who visited the Texas A&M University animal science website, a concern was that anyone who visited the website could have responded and could also have taken it as many times as they wanted. Respondents were asked for their names; however, that was optional. Similarly, IP addresses were used to examine data for redundancy. Thus, if a respondent started a session, completed half of the questions, submitted them, and then returned later to answer the remaining questions, those analysts receiving the responses were able to combine partial questionnaires into a complete response if it was obvious that two partials equaled a whole from the same source. There was no perfect way to ensure that participants would actually be animal science graduates and would respond only once. One proactive, preventative measure for this problem was to state the importance of completing the instrument only once and of being an animal science graduate. A total of 723 individuals responded to the online survey.

Data Analysis

After data were collected and stripped of any personal identifiers, the data were provided to the Department of Agricultural Leadership, Education, and Communications (ALEC). Researchers examined the data and eliminated any blank (unanswered) questionnaires.

Information from the survey was categorized to analyze answers in a more simplistic manner. By conducting a survey such as this one, the researchers were able to break down the different views among animal science graduates and find correlations between questions in the survey and make confident assumptions for the reasoning of certain career choices by the participants of the survey. The goal of the researchers in this study was to use the correlations found in the survey and determine what factors influenced the graduates to choose the career path they chose. Data were analyzed to:

- Describe graduates of the Department of Animal Science in terms of year graduated, gender, background and experience before coming to Texas A&M, and whether they transferred to TAMU or were admitted as freshmen.
- Determine whether they completed an internship at TAMU during their undergraduate education, whether they attended graduate or professional school after graduation, and whether they were employed in animal science or animal-related careers.
- Describe perceptions of graduates of their educational experiences in the Department of Animal Science.

- Examine relationships between personal and background characteristics of animal science graduates and their perceptions of their education in the department.
- Examine relationships between their perceptions of their education and their career decisions.

CHAPTER IV

FINDINGS AND DISCUSSION

The purpose of this study was to examine background characteristics and perceptions of animal science graduates from Texas A&M University to determine what factors of the animal science curriculum were related to their career choice. The responding sample comprised 723 questionnaires. Several were incomplete or inappropriate in terms of legitimate responses. The data sample, then, comprised 633 responses with complete or nearly complete data that were used in the analyses.

Demographics of Participants

The questionnaire used to collect data for this study consisted of seven items regarding background characteristics of participants in the study.

Data in Table 1 show the total number of participants categorized by gender. The responders consisted of 50.6% male and 49.4% female. Interestingly in recent years there has been an extreme increase in female students in animal science.

Table 1

Gender of Participants

Gender	Frequency	Percent
Male	319	50.6
Female	312	49.4
Total	631	100.0

Data in Table 2 portray participants divided into categories based on the participant's year of graduation. Participants were divided based on operational definitions of their career status. The categories were early graduates (1950–1980) who were assumed to be near the end of or late in their work careers, 1981–1990 who were mature in their careers, 1991–2000 who were in established careers, 2001–2005 who were establishing careers, and 2006–2010 who were beginning careers.

Table 2

Year of Graduation of Respondents Who Were Graduates of the Department of Animal Science, 1950–2010

Year Range	Frequency	Percent
1950–1980	121	19.2
1981–1990	110	17.5
1991–2000	150	23.8
2001–2005	120	19.0
2006–2010	129	20.5
Total	630	100.0

Note. Participants were categorized by the year they graduated to compare perceptions of participants of various age groups on statements related to the animal science curriculum.

Table 3 illustrates levels of agricultural background/experience of respondents. Categories of experience levels were defined by examples. Limited background was defined as classes, field trips, etc. Respondents who answered to having “some” background had participated in 4-H/FFA projects, etc. Experienced background was defined as, for example, “worked with farm animals/on livestock operations several times,” and “Very Experienced” had the example of “grew up and/or worked full time for a livestock operation.” According to the respondents, 65.3% were experienced or very experienced in agriculture before entering college. Only 18.4% of the respondents claimed to have little or no experience, and 16.3% claimed to have some experience.

Table 3

Agricultural Experience of Animal Science Respondents Before Entering College

Level of Experience	Frequency	Percent
None	49	7.7
Little	68	10.7
Some	103	16.3
Experienced	193	30.5
Very Experienced	220	34.8
Total	633	100.0

Most respondents did not transfer into Texas A&M University; this is illustrated by data in Table 4. Only 28.6% of respondents were transfer students.

Table 4

Respondents Who Did or Did Not Transfer Into Texas A&M University

Transferred into TAMU?	Frequency	Percent
No	450	71.4
Yes	180	28.6
Total	630	100.0

Table 5 shows the numbers and percentages of respondents who did and did not attend graduate school; 42.2% went to graduate school. Many students who enter the professional curriculum in veterinary medicine (DVM program) were animal science majors as undergraduate; this may explain the high percentage of participants who attended graduate school.

Table 5

Respondents Who Did or Did Not Attend Graduate School

Did you attend graduate school?	Frequency	Percent
No	365	57.8
Yes	267	42.2
Total	632	100.0

Only 21.1% of respondents participated in an internship during their undergraduate degree; these data are shown in Table 6. There are many student worker positions available each year in the Department of Animal Science; these positions are often filled by animal science students. Perhaps this could explain the relatively low number of respondents who did an internship while an undergraduate in animal science.

Table 6

Participants Who Did an Internship During Their Undergraduate Degree Program

Did you do an internship?	Frequency	Percent
No	494	78.9
Yes	132	21.1
Total	626	100.0

A seventh question on the instrument asked respondents whether their current career was directly related to their degree in animal science. Table 7 illustrates respondents who are currently working in a career directly related to animal science. A large majority (62.9%) indicated that they were not currently working in a career directly related to their major in animal science. Participants also answered some open-ended questions which may help explain the reasons that 37.1% of respondents were working in a career directly related to animal science.

Table 7

Participants Currently Working or Not Working in a Career Directly Related to Animal Science

Are you currently working in a career directly related to animal science?	Frequency	Percent
No	394	62.9
Yes	232	37.1
Total	626	100.0

Crosstabulations of Demographic Variables

Gender, year graduated (actually, as a kind of proxy for current age), and experience in agriculture before entering college, are three variables that are antecedent to whether one was a transfer, did an internship, or attended graduate school. So, the next analyses were conducted to determine if gender and other background or situational variables were related.

A crosstabulation of gender and graduation year group is reported in Table 8. As shown in the table, both numbers and percentages of females graduating in animal science have steadily increased for most year groups. Those numbers seem to have leveled off in the past 10 years, with about two-thirds (165 of 249) of respondents from 2001–2010 being females. The Agricultural and Mechanical College of Texas (prior to 1963) or Texas A&M University (since 1963) was an all-male, all-military institution until the late 1960s. Women were admitted freely beginning in the late 1960s, so the number of female graduates in earlier years was affected by the gender segregation of the college/university.

Table 8

Crosstabulation of Gender and Year Graduated

Year Graduated	Response				Total
	Male <i>f</i>	% Within Gender	Female <i>f</i>	% Within Gender	
1950–1980	102	32.1%	19	6.1%	121
1981–1990	61	19.2%	47	15.2%	108
1991–2000	71	22.3%	79	25.5%	150
2001–2005	35	11.0%	85	27.4%	120
2006–2010	49	15.4%	80	12.7%	129

The crosstabulation of gender and agricultural experience before entering college is shown in Table 9. Of male respondents, 81.5% reported to have been experienced or very experienced in agriculture before entering college while less than half of female respondents claimed to have the same amount of agricultural experience before entering college. That is, males assessed themselves to be more highly experienced in agriculture prior to entering college than did females.

Table 9

Cross Tabulation of Gender and Level of Agricultural Experience Prior to College

Experience Level	Gender				Total
	Male <i>f</i>	% Within Gender	Female <i>f</i>	% Within Gender	
None	12	3.8%	36	11.5%	48
Little	25	7.8%	42	13.5%	67
Some	22	6.9%	81	26.0%	103
Experienced	116	36.4%	77	24.7%	193
Very Experienced	144	45.1%	76	24.4%	220
Total	319	100.0%	312	100.0%	631

Table 10 shows that 64.2% of male respondents were non-transfer students while 78.8% of female respondents were non-transfer students.

Table 10

Crosstabulation of Gender and Transfer Status

Transfer/Non-Transfer	Response, <i>f</i>				Total
	Male <i>f</i>	% Within Gender	Female <i>f</i>	% Within Gender	
Transfer	113	35.8%	66	21.2%	179
Non-Transfer	203	64.2%	246	78.8%	449

The attendance in graduate or professional school after receiving a B.S. degree in animal science by gender is illustrated in Table 11. Over half of both male and female participants did not attend graduate or professional school but a slightly higher percentage of males, 45.3%, attended than females, 38.8%.

Table 11

Crosstabulation of Gender and Attendance in Graduate/Professional School After B.S. Degree in Animal Science

Graduate/Professional School After Graduation?	Gender				Total
	Male <i>f</i>	% Within Gender	Female <i>f</i>	% Within Gender	
Yes	144	45.3%	121	38.8%	265
No	174	54.7%	191	61.2%	365

Table 12 illustrates that female participants of this study tended to participate in an internship during college slightly more often than did males, with percentages of 25.4% and 17.0%, respectively, for internship participation.

Table 12

Crosstabulation of Gender and Internship

Internship Participation	Gender				Total
	Male <i>f</i>	% Within Gender	Female <i>f</i>	% Within Gender	
Yes	54	17.0%	78	25.4%	132
No	263	83.0%	229	74.6%	492

According to Table 13, male participants were more likely to have a career related to their animal science degree than were females. Almost half (45.9%) of males reported that they were in careers related to their animal science degree while slightly more than one-fourth (28.1%) of females indicated animal science-related careers.

Table 13

Crosstabulation of Gender and Whether Career Is Related to Animal Science Degree

Career Related to Animal Science Degree?	Gender				Total
	Male <i>f</i>	% Within Gender	Female <i>f</i>	% Within Gender	
Yes	144	45.9%	87	28.1%	231
No	170	54.1%	223	71.9%	393

The crosstabulation of data reported in Table 14 suggests that the earlier participants graduated (1950-1980), the higher the level of agricultural experience they were likely to have. However, for those who graduated since 1980 (1981-2010), background agricultural experiences were similar. In others words, there seemed to be a dichotomy with those graduating in 1980 or before having more experience than those graduating after 1980. Mechanized agriculture and the decrease in the number of smaller commercial agriculture operations may have aided in the change of experience by participants.

Table 14

Crosstabulation of Year Graduated and Level of Agricultural Experience

Experience Level	Year Graduated					Total	
	1950– 1980	1981– 1990	1991– 2000	2001– 2005	2006– 2010	<i>f</i>	%
None	6.6%	8.2%	8.7%	5.0%	10.1%	49	7.8
Little	7.4%	9.1%	12.0%	13.3%	10.9%	67	10.6
Some	2.5%	27.3%	17.3%	16.7%	18.6%	103	16.3
Experienced	42.1%	29.1%	24.7%	30.8%	27.1%	192	30.5
Very Experienced	41.3%	26.4%	26.4%	34.2%	33.3%	216	34.8

Table 15 suggests there is little relationship between the year of graduation of participants and their likelihood of being a transfer student.

Table 15

Crosstabulation of Year Graduated and Transfer Status

Transfer Status	Year Graduated					Total	
	1950–1980	1981–1990	1991–2000	2001–2005	2006–2010	<i>f</i>	%
No	69.2%	71.8%	70.5%	70.8%	75.0%	448	71.5
Yes	30.8%	28.8%	29.5%	29.2%	25.0%	179	28.5

Table 16 suggests there is little relationship between the year of graduation of participants and their likelihood of attending graduate school.

Table 16

Crosstabulation of Year Graduated and Graduate School Attendance

Attended Graduate School	Year Graduated					Total	
	1950–1980	1981–1990	1991–2000	2001–2005	2006–2010	<i>f</i>	%
No	53.3%	59.1%	58.0%	64.2%	55.0%	364	57.9
Yes	46.7%	40.9%	42.0%	35.8%	45.0%	265	42.1

Table 17 shows there is a correlation between year graduated and participation in an internship. The more recent participants graduated, the more likely they were to do an internship during college. This may be a result of more internships being offered by

companies. In earlier years there may have been more students working part time in agriculture, but the jobs were not considered internships.

Table 17

Crosstabulation of Year Graduated and Internship

Internship	Year Graduated					Total	
	1950– 1980	1981– 1990	1991– 2000	2001– 2005	2006– 2010	<i>f</i>	%
No	93.3%	89.1%	74.5%	72.5%	67.2%	491	78.8
Yes	6.7%	10.9%	25.5%	27.5%	32.8%	132	21.2

There was no relationship between year graduated and whether participants are in a career related to their animal science degree which is shown by Table 18.

Table 18

Crosstabulation of Year Graduated and Career Related to Degree in Animal Science

Career Related to Degree in Animal Science	Year Graduated					Total	
	1950– 1980	1981– 1990	1991– 2000	2001– 2005	2006– 2010	<i>f</i>	%
No	58.5%	70.0%	66.9%	61.3%	57.0%	391	62.8
Yes	41.5%	30.0%	33.1%	38.7%	43.0%	232	37.2

Table 19 shows that, among transfer students, almost three-fourths were experienced or very experienced in agriculture prior to college. Of non-transfer students, fewer than two-thirds had similar levels of experience. Thus, transfer students were more agriculturally-experienced than were their non-transfer counterparts.

Table 19

Crosstabulation of Transfer Status and Agricultural Experience Level

Experience Level	Transfer Status				Total
	Transfer <i>f</i>	Transfer %	Non-Transfer <i>f</i>	Non-Transfer %	
None	14	7.78%	34	7.56%	62
Little	10	5.56%	57	12.67%	77
Some	25	13.89%	78	17.33%	128
Experienced	57	31.67%	136	30.22%	170
Very Experienced	74	41.11%	145	32.20%	266
Total	180		450		630

According to Table 20, level of agricultural experience prior to college and attending graduate school are related. As level of agricultural experience increased, participants were more likely to have attended graduate or professional school than were those who did not attend graduate school. That is, 41.6 percent of those who attended

graduate school were very experienced; on the other hand, only 29.9 percent of those who did not attend graduate school were very experienced

Table 20

Crosstabulation of Attendance in Graduate or Professional School and Agricultural Experience Level

Level of Experience	<i>f</i>	Attended Graduate School	<i>f</i>	Did Not Attend Graduate School
None	20	7.5%	29	7.9%
Little	30	11.2%	38	10.4%
Some	35	13.1%	68	18.6%
Experienced	71	26.6%	121	33.2%
Very Experienced	111	41.6%	109	29.9%
Total	267		365	

Table 21 shows there is a small relationship between level of agricultural experience prior to college and participants doing an internship. The very experienced participants were slightly more likely to do an internship than were participants with other levels of agricultural experience.

Table 21

Crosstabulation of Agricultural Experience Level and Whether Participants Did an Internship During Undergraduate Degree Program

Level of Experience	<i>f</i>	Internship	<i>f</i>	No Internship
None	9	18.34%	40	81.66%
Little	12	17.91%	55	82.09%
Some	23	22.55%	79	77.45%
Experienced	34	17.89%	156	82.11%
Very Experienced	54	24.77%	164	75.23%
Total	132		494	

Table 22 illustrates that, of those who were in animal science-related careers, 48.3% were very experienced in agriculture prior to college. Of those who were in careers unrelated to their animal science degree, only 26.5% were very experienced in agriculture prior to college.

Table 22

Crosstabulation of Agricultural Experience Level and Career Related to Degree in Animal Science

Level of Experience	<i>f</i>	Career Related to Animal Science Degree	<i>f</i>	Non-Related Career to Animal Science Degree
None	11	4.7%	38	9.6%
Little	23	9.9%	45	11.4%
Some	25	10.8%	77	19.5%
Experienced	61	26.3%	130	33.0%
Very Experienced	112	48.3%	104	26.5%
Total	232		394	

Table 23 shows that non-transfer students were more likely (43.89%) to attend graduate school than students who were transfer students (26.89%).

Table 23

Crosstabulation of Transfer Status and Attendance in Graduate or Professional School

Transfer Student?	<i>f</i>	Attended Graduate School	<i>F</i>	Did Not Attend Graduate School
No	193	43.89%	257	56.11%
Yes	71	26.89%	193	73.11%
Total	179		450	

In Table 24 the information shows that non-transfer students were slightly more likely to do an internship during college than transfer students.

Table 24

Crosstabulation of Transfer Status and Internship

Transfer Student?	<i>f</i>	Internship	<i>F</i>	No Internship
No	104	23.32%	342	76.68%
Yes	28	15.82%	149	84.18%
Total	132		491	

Table 25 shows there is no significant association between being a transfer student and working in a career related to animal science.

Table 25

Crosstabulation of Transfer Status and Career Related to Degree in Animal Science

Transfer Student?	<i>f</i>	Career Related to Animal Science Degree	<i>F</i>	Non-Related Career to Animal Science Degree
No	165	37.16%	279	62.84%
Yes	65	36.31%	114	63.69%
Total	230		393	

Table 26 shows that participants who did an internship had a higher percentage of attending graduate school (49.24%) than participants who did not do an internship (39.96%).

Table 26

Crosstabulation of Internship and Attendance in Graduate or Professional School

Internship	<i>f</i>	Attended Graduate School	<i>F</i>	No Graduate School
No	197	39.96%	296	60.04%
Yes	65	49.24%	67	50.76%
Total	262		363	

Table 27 shows a higher percentage (47.41%) of participants who had a career related to their degree in animal science were more likely to attend graduate school than participants who had a career related to their degree in animal science but did not attend graduate school (39.19%).

Table 27

Crosstabulation of a Career Related to Degree in Animal Science and Attendance in Graduate or Professional School

Career Related to Degree in Animal Science	<i>f</i>	Attended Graduate School	<i>F</i>	Did Not Attend Graduate School
No	154	39.19%	239	60.81%
Yes	110	47.41%	122	52.59%
Total	264		361	

Graduates' Perceptions of the Animal Science Curriculum

Table 28 illustrates the participants' perceptions of the animal science curriculum and of their experiences within the courses. The question with the highest level of agreement was, "Use of and access to live animals is important for ANSC courses and its curriculum." Four hundred twenty-six strongly agreed and 147 agreed with this statement; only seven disagreed or strongly disagreed. The mean response was 4.67 with a standard deviation of .62. Exposure to producers and industry leaders through ANSC courses was

also considered very important with a mean of 4.54 and a standard deviation of .57. Emphasis on integrity and character as well as emphasis on work ethics were also listed as having an overall high importance level of 4.54/.63 (*M/SD*) and 4.39/.68, respectively. In addition, current issues in the livestock industry and communication skills were also in the top statements which respondents agreed with. Interestingly the statements with the highest agreement levels were statements that indicated the importance of industry and generic skills in the animal science curriculum. Statements with lowest means suggested that adequate help or more emphasis be put on certain areas within the animal science curriculum.

Table 28

Participants' Level of Agreement with Statements Related to the Animal Science Curriculum

Statement	Response, f					<u>Mean</u> <u>SD</u>
	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	
Use of and access to live animals is important for ANSC courses and its curriculum.	5	2	11	147	426	<u>4.67</u> <u>.62</u>
Exposure to producers and industry leaders through ANSC courses is important.	0	3	15	233	342	<u>4.54</u> <u>.57</u>
Emphasis on integrity and character are important for ANSC students.	3	4	14	228	344	<u>4.53</u> <u>.63</u>

Table 28 Continued

Statement	Response, <i>f</i>					<u>Mean</u> <u><i>SD</i></u>
	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	
Information about current and emerging issues in livestock industries is important in an ANSC curriculum.	1	2	19	295	276	<u>4.42</u> .59
Emphasis on work ethic is important for ANSC students.	3	6	30	272	280	<u>4.39</u> .68
Emphasis on communications skills such as writing and oral presentations directly related to ANSC course materials is important.	2	10	45	253	283	<u>4.37</u> .72
Emphasis on livestock production and the Texas and U.S. livestock industries is important for ANSC students.	0	8	47	282	253	<u>4.32</u> .68
The information gained from a college course is more important than the grade received.	7	30	78	262	215	<u>4.09</u> .89
ANSC students need knowledge and experience with basic animal husbandry (animal handling techniques, animal behavior) as part of the curriculum.	10	32	61	288	202	<u>4.08</u> .90
I feel comfortable reading scientific/research reports and interpreting their information/data.	6	37	72	271	207	<u>4.07</u> .90

Table 28 Continued

Statement	Response, <i>f</i>					<u>Mean</u> <u><i>SD</i></u>
	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	
Interpretation of scientific reports and data should be an important component of the ANSC curriculum.	5	15	86	314	174	<u>4.07</u> .78
Exposure to international internship, education and/or career options is important for ANSC students.	1	27	123	247	194	<u>4.02</u> .86
Scenario-based case studies are useful to incorporate into ANSC courses.	3	14	81	370	124	<u>4.01</u> .70
Specialized certification options (equine science, meat science, beef cattle science) would be useful in ANSC program.	7	30	119	278	158	<u>3.93</u> .88
Courses in the ANSC curriculum were arranged in a meaningful order.	5	16	111	389	71	<u>3.85</u> .69
My level of interaction with my academic advisor(s) was adequate.	31	77	85	247	150	<u>3.69</u> 1.69
Exposure to more research opportunities would have been desirable.	8	63	169	262	90	<u>3.61</u> .91
The ANSC program adequately prepared me for my career path.	18	65	129	297	83	<u>3.61</u> .96

Table 28 Continued

Statement	Response, <i>f</i>					<u>Mean</u> <i>SD</i>
	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	
The ANSC degree program would have been better if it had incorporated more business management type emphasis.	16	94	105	270	108	<u>3.61</u> 1.04
Animal science programs should include information about animal welfare and animal rights.	24	80	177	234	75	<u>3.43</u> 1.01
The option to emphasize companion animals should be incorporated in the ANSC program.	60	139	204	147	42	<u>2.96</u> 1.08
The ANSC curriculum and/or courses emphasized creativity.	17	166	264	132	11	<u>2.92</u> .83
Most animal science courses relied too much on memorization as opposed to understanding concepts.	54	268	123	129	19	<u>2.65</u> 1.02

Relationships of Experience Levels and Agreement Levels

A non-parametric, Spearman's rho correlation coefficient was calculated for level of experience (0 = none to 4 = very experienced) in agriculture prior to college and participants' level of agreement with each of the 23 statements assessing the animal science program. Table 29 displays Spearman's rho correlation coefficients to indicate relationships of participants' levels of experience and their levels of agreement with the

23 statements. Positive correlations suggest that as experience levels increase, agreement levels of participants also increase. Negative correlations mean that as experience level decreases, agreement levels of participants increased.

The strongest positive correlation in Table 29 is for the relationship of experience level and the statement “Emphasis on livestock production and the Texas and U.S. livestock industries is important for ANSC students” with a correlation of ($\rho = .20$). Other positive correlations were seen in the relationships of levels of experiences and agreement levels with the statements “Most animal science courses relied too much on memorization as opposed to understanding concepts.” and “The ANSC degree program would have been better if it had incorporated more business management type emphasis.” with correlations of ($\rho = .14$) and ($\rho = .11$), respectively. Participants with less experience prior to college more strongly agreed with the statements, “The option to emphasize companion animals should be incorporated in the ANSC program” and “Exposure to more research opportunities would have been desirable,” with correlations of ($\rho = -.28$) and ($\rho = -.11$).

Table 29

Correlation of Experience in Agriculture Prior to College (0 = none to 4 = very experienced) and Level of Agreement with Statements about the Animal Science Curriculum

Statement	Spearman's rho Correlation Coefficient
	Level of Experience
Use of and access to live animals is important for ANSC courses and its curriculum.	-.02
Exposure to producers and industry leaders through ANSC courses is important.	.09*
Emphasis on integrity and character are important for ANSC students.	.02
Information about current and emerging issues in livestock industries is important in an ANSC curriculum.	.08
Emphasis on work ethic is important for ANSC students.	.06
Emphasis on communications skills such as writing and oral presentations directly related to ANSC course materials is important.	.03
Emphasis on livestock production and the Texas and U.S. livestock industries is important for ANSC students.	.20**
ANSC students need knowledge and experience with basic animal husbandry (animal handling techniques, animal behavior) as part of the curriculum.	.07
I feel comfortable reading scientific/research reports and interpreting their information/data.	<.01
Interpretation of scientific reports and data should be an important component of the ANSC curriculum.	-.06

Table 29 Continued

Statement	Spearman's rho Correlation Coefficient
	Level of Experience
The information gained from a college course is more important than the grade received.	.01
Exposure to international internship, education and/or career options is important for ANSC students.	-.08
Scenario-based case studies are useful to incorporate into ANSC courses.	.02
Specialized certification options (equine science, meat science, beef cattle science) would be useful in ANSC program.	.02
Courses in the ANSC curriculum were arranged in a meaningful order.	-.07
My level of interaction with my academic advisor(s) was adequate.	.09*
Exposure to more research opportunities would have been desirable.	-.11**
The ANSC program adequately prepared me for my career path.	.03
The ANSC degree program would have been better if it had incorporated more business management type emphasis.	.11**
Animal science programs should include information about animal welfare and animal rights.	-.02
The option to emphasize companion animals should be incorporated in the ANSC program.	-.28**
The ANSC curriculum and/or courses emphasized creativity.	-.02
Most animal science courses relied too much on memorization as opposed to understanding concepts.	.14**

Relationships of Animal Science Career Relatedness and Agreement Levels

Table 30 illustrates the relationships of levels of agreement and participants' career status (0 = unrelated, 1 = related to their animal science degree). Point biserial correlation coefficients revealed relationships between whether a student had a career related to animal science and their levels of agreement with statements about the animal science curriculum. A more positive correlation coefficient means that participants who had a career related to animal science had a higher level of agreement with a statement. A negative coefficient, on the other hand, means more agreement by participants who did not have a career related to their animal science degree.

As one might expect, those who had a job related to animal science agreed more fully with the statement that “the animal science program adequately prepared me for my career path” ($r_{pbs} = .28$); those with animal science-related careers also agreed more strongly that the animal science program should include information about animal welfare and animal rights ($r_{pbs} = .15$). Similarly, participants who had animal science-related careers believed more strongly that information gained from a college course is more important than the grade received ($r_{pbs} = .11$) and that the level of interaction with their academic advisor was adequate ($r_{pbs} = .15$).

On the other hand, those participants who were NOT in animal science-related careers believed more strongly that the option to emphasize companion animals should be incorporated into the animal science program ($r_{pbs} = -.21$) and exposure to more research opportunities would have been desirable ($r_{pbs} = -.14$).

Table 30

Relationship of Related Career and Level of Agreement with Statements about the Animal Science Curriculum

Statement	Point Biserial Correlation Coefficient Related Job
Use of and access to live animals is important for ANSC courses and its curriculum.	.01
Exposure to producers and industry leaders through ANSC courses is important.	.07
Emphasis on integrity and character are important for ANSC students.	.02
Information about current and emerging issues in livestock industries is important in an ANSC curriculum.	.04
Emphasis on work ethic is important for ANSC students.	.03
Emphasis on communications skills such as writing and oral presentations directly related to ANSC course materials is important.	.02
Emphasis on livestock production and the Texas and U.S. livestock industries is important for ANSC students.	.07
The information gained from a college course is more important than the grade received.	.11**
ANSC students need knowledge and experience with basic animal husbandry (animal handling techniques, animal behavior) as part of the curriculum.	.03
I feel comfortable reading scientific/research reports and interpreting their information/data.	.09*
Interpretation of scientific reports and data should be an important component of the ANSC curriculum.	.07
Exposure to international internship, education and/or career options is important for ANSC students.	-.06
Scenario-based case studies are useful to incorporate into ANSC courses.	.05

Table 30 Continued

Statement	Point Biserial Correlation Coefficient Related Job
Specialized certification options (equine science, meat science, beef cattle science) would be useful in ANSC program.	-.03
Courses in the ANSC curriculum were arranged in a meaningful order.	.07
My level of interaction with my academic advisor(s) was adequate.	.15**
Exposure to more research opportunities would have been desirable.	-.14**
The ANSC program adequately prepared me for my career path.	.28**
The ANSC degree program would have been better if it had incorporated more business management type emphasis.	.002
Animal science programs should include information about animal welfare and animal rights.	.15**
The option to emphasize companion animals should be incorporated in the ANSC program.	-.21**
The ANSC curriculum and/or courses emphasized creativity.	.05
Most animal science courses relied too much on memorization as opposed to understanding concepts.	.08*

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to evaluate animal science graduates from Texas A&M University to determine what factors of the animal science curriculum affected their career choice. The objectives developed to guide this study were as follows:

1. What demographic, personal, and experiential/background attributes did graduates have upon entering the program in animal science?
2. Did graduates experience internships or graduate school as part of their educational program?
3. What were perceptions of animal science graduates of their educational experiences in the department?
4. What were the current employment situations of animal science graduates?
5. Were background characteristics and experiences related to their current employment situations?
6. Were background characteristics and experiences related to their perceptions of their educational experiences in animal science at Texas A&M University?
7. Were perceptions of animal science graduates of their educational experiences related to their current employment situations?

The population for this study consisted of Texas A&M animal science graduates from 1950–2010. A faculty committee in the Department of Animal Science was formed, and members developed a set of questions which they believed would help

decipher why animal science graduates were choosing the careers they were in and what factors as animal science majors affected graduates' career paths. Data were collected through an online survey; the data collection process ran for approximately 7 weeks in July and August of 2010. There were 723 individuals who provided responses, with useable data from 633 respondents. Data were then analyzed, conclusions made, and similar research was examined to aid in interpreting the results of the research.

Conclusions

Participants in this research ranged in graduation year from 1950–2010. They were asked questions which measured gender, level of agricultural experience prior to college, transfer student status, attendance in graduate school, internships, and career status in relation to animal science. Each category was crosstabulated with one another to discover any correlations that would aid in answering the seven main questions of the research. Of the 630 respondents, 50.6% were males and 49.4% were females. Male participants were more likely to have a stronger agricultural background prior to college than females, with 45.1% of males being very experienced while only 24.4% of females were very experienced. Almost half (45.9%) of males reported that they were in careers related to their animal science degree while slightly more than one-fourth (28.1%) of females indicated animal science-related careers. Females were found less likely to be transfer students than males, with percentages being 21.2% and 35.8%, respectively. Less than half of both male and female participants attended graduate or professional school, but a slightly higher percentage of males, 45.3%, attended than females, 38.8%.

Participants who graduated in earlier years (1950-1980) were more likely to have a higher level of agricultural experience than were participants who graduated in more recent years. Mechanized agriculture and the decrease in the number of smaller commercial agriculture operations may have contributed to this change in the level of experience of participants. Students who were very experienced in agriculture prior to college were more likely (more than half of the respondents) to be in a career related to their animal science degree than were those with other levels of experience (fewer than two-fifths).

Opinions of participants about the animal science curriculum and their experiences within the courses were requested. Participants were given statements and asked to indicate their level of agreement or disagreement using a 5-point scale of “strongly disagree” to “strongly agree.” Then, the researcher coded the responses with number 1 to 5, with “strongly disagree” coded as 1 and “strongly agree” coded as 5. The statements with the highest level of agreement were related to practical, industry involvement and generic skills and attributes. Statements with which respondents, on average, agreed or strongly agreed, were as follows:

Use of and access to live animals is important for ANSC courses and its curriculum. $M = 4.67$

Exposure to producers and industry leaders through ANSC courses is important. $M = 4.54$

Emphasis on integrity and character are important for ANSC students. $M = 4.53$

Information about current and emerging issues in livestock industries is important in an ANSC curriculum. $M = 4.42$

Emphasis on work ethic is important for ANSC students. $M = 4.39$

Emphasis on communications skills such as writing and oral presentations directly related to ANSC course materials is important. $M = 4.37$

Emphasis on livestock production and the Texas and U.S. livestock industries is important for ANSC students. $M = 4.32$

Statements with which respondents disagreed or were ambivalent or neutral were as follows:

Most animal science courses relied too much on memorization as opposed to understanding concepts. $M = 2.65$

The ANSC curriculum and/or courses emphasized creativity. $M = 2.92$

The option to emphasize companion animals should be incorporated in the ANSC program. $M = 2.96$

Implications

The research does not support evidence of why earlier graduates of animal science were more likely to have a career directly related to their degree. As mentioned previously in this research, the primary goal of the animal science curriculum in the early 1900s was to produce farmers (Coffey, 1917). One might conclude that in earlier years there was more focus by individuals to learn how to farm and ranch to take care of their own land. Today's animal science students are more diversified in their interests and future careers. Results showed that earlier graduates had a higher level of agriculture

background prior to college. Having an undergraduate degree now makes it possible for graduates to enter into veterinary medicine, large, agricultural-related industries, FDA regulatory jobs, and many more. It is becoming more common for students to choose animal science as a major if they are planning on studying veterinary medicine after receiving their undergraduate degree (Ilgen et al., 2003).

This research showed that level of experience prior to college was directly related to participants' having a career related to animal science. Jelinski et al. (2008) supported the idea that students who have a higher level of agricultural experience prior to college are more likely to have a career directly related to animal science. That is, people who grow up in a certain lifestyle tend to continue as adults to enter careers similar to the way their parents made a living. Buchanan (2008) suggested that the animal science curriculum would benefit by a change to accommodate the interests of the new urbanized population of animal science students without ignoring the desires of traditional students from farms and ranches. The current study supports suggestions made in the Buchanan study.

The more recent participants graduated, the more likely they were to do an internship during college. This may be a result of more internships being offered by companies. In earlier years there may have been more students working part time in agriculture, but the jobs were not considered internships.

In earlier years there was a larger percentage of males involved in agriculture and fewer numbers of females. Now, with a wider range of careers in agriculture, females have become more common working in agriculture. Results showed that males more

than females had high levels of experience in agriculture before college. This could be because of traditional roles where, on average, males were more likely to do more physical labor than were females—especially because of chores at a younger age.

Arango (n.d.) found there to be eight major factors that agriculture employers were looking for when hiring: communicating, managing people and tasks, crop production, entrepreneurial skills, managing self, livestock production, and mobilizing innovation and change. Arango's findings are congruent with the results of this study. Findings here may suggest why participants who were not currently involved in a career within animal science chose the career paths that they did. One may infer that some students majoring in animal science limit their career options because they did not develop skills in communication and management—skills which employers desire in all employees.

1. What demographic, personal, and experiential/background attributes did graduates have upon entering the program in animal science? Participants of the survey consisted of 50.6 percent male and a 49.4 percent female and graduated in the years ranging from 1950–2010. Participants were classified by experience level in five categories ranging from very experienced to none. There were 34.8 percent of participants who were very experienced prior to their college education. Each subsequent lower level of experience had a decreasing number of participants with the “none” (no experience) category having only 7.7 percent of participants.

2. Did graduates experience internships or graduate school as part of their educational program? About one-fifth of participants did an internship during their undergraduate degree in animal science. Of the participants of this study, two-fifths attended graduate school.
3. What were perceptions of animal science graduates of their educational experiences in the department? Educational experiences among participants varied among individuals. Interestingly the statements with the highest agreement levels were statements that asked if there was an importance in certain areas within the animal science curriculum. The statement dealing with the importance of use and access to live animals for ANSC courses and its curriculum was considered the most important statement by participants. Exposure to producers and industry leaders through ANSC courses was also considered very important as well as emphasis on integrity and character and work ethics. In addition, current issues in the livestock industry and communication skills were also in the top statements which respondents agreed with. The statements that had the lowest means asked if adequate help or emphasis was put on certain areas within the animal science curriculum. The statement, “most animal science courses relied too much on memorization as opposed to understanding concepts.” had the lowest agreement level. The next lowest response was, “The ANSC curriculum and/or courses emphasized creativity.” with 183 out of 590 respondents disagreeing or strongly disagreeing. Of those same respondents 264 of them

answered neutral, which was also the highest number of neutral answers out of all the statements.

4. What were the current employment situations of animal science graduates?

There were 37.1 percent of participants who were currently in a career directly related to their animal science degree; thus, 62.9 percent of the respondents indicated that their careers were not related to their animal science degree.

5. Were background characteristics and experiences related to their current employment situations? Those participants who reported higher levels of experience in agriculture prior to college were more likely to have careers involved in agriculture than were those who had lower levels of experience prior to college.

6. Were background characteristics and experiences related to their perceptions of their educational experiences in animal science at Texas A&M University? Participants who had previous experience within agriculture prior to college agreed most strongly with the statements, “Emphasis on livestock production and the Texas and U.S. livestock industries is important for ANSC students.” and “Most animal science courses relied too much on memorization as opposed to understanding concepts.” with high agreement levels from participants who had prior agricultural experience. Participants with the least amount of agricultural experience prior to college most strongly agreed with

the statement, “Exposure to more research opportunities would have been desirable.”

7. Were perceptions of animal science graduates of their educational experiences related to their current employment situations? The following relationships were found between whether a student had a job related to animal science and their levels of agreement with statements about the animal science curriculum: Those participants who had a job related to animal science agreed more fully with the statement that “the animal science program adequately prepared me for my career path” and that the animal science program should include information about animal welfare and animal rights. Similarly, participants who had a job related to animal science believed more strongly that information gained from a college course was more important than the grade received and that the level of interaction with their academic advisor was adequate. On the other hand, those participants who were NOT in animal science-related careers believed more strongly that exposure to more research opportunities would have been desirable and that the option to emphasize companion animals should be incorporated into the animal science program.

Recommendations for Further Research or for Practice

Because respondents were least in agreement with the statement about the curriculum emphasizing creativity and because of the agreement with the importance of practical, industry involvement and communication skills, the department should

consider a capstone course pertaining to ranch management (with opportunities for students to choose specialized or species-specific animal businesses to “manage”). The course should be project-based, emphasizing problem solving, critical thinking, and creativity.

Animal science faculty may find that asking graduates if they had originally planned on pursuing a career related to animal science and how they believed that the animal science curriculum could have prepared them for their individual careers. The department may also benefit from asking graduates what factors led them to their current careers and how or if the animal science curriculum could have been altered to accommodate students’ skills or knowledge for potential jobs.

The animal science faculty at Texas A&M should consider how to improve the areas that respondents believed that the department had relative weakness in and also make sure the different topics of importance are incorporated into the animal science curriculum.

Attitudes among students and subsequent graduates will change continuously from semester to semester, year to year, and decade to decade. Continuous research in the area of curriculum development (needs assessment, follow-up of graduates, input from employers and other stakeholders—in addition to the changing science and technologies of animal science—is needed to keep up with constant change within the learning, industry, and scientific environments. Improvements in teaching and learning are what all universities strive for. Improving a teaching method or enhancing the interests of learners will enhance perceptions of potential attendees about the learning

environment. Having more positive recognition for a learning facility will cause an aspiration by potential learners to attend. The level of career aspiration usually affects curriculum choice (Herr & Cramer, 1996). By a faculty keeping the animal science curriculum interesting and interactive, students will have a stronger desire to continue their studies and to work in careers in agriculture.

It is no secret that teachers are a major factor in influencing students' decisions in a field of study. Some courses are taught by "student teachers" and/or graduate teaching assistants. These student teachers can have just as much influence on students as professor. "Because the decision to enter teaching [and the professoriate] is made by the student teacher [or graduate student/graduate teaching assistant], insight into their perceptions of the teaching experience, particularly the [interactions with their cooperating teacher [or major professor/teaching mentor], is invaluable" (Roberts, 2006, p. 1). This is a very important issue that should also be researched in order to get a more accurate assessment of decisions made by animal science graduates based on their educational experiences and their career choices. Some research has been done on this topic that may benefit further research dealing with student teachers. A study done by Edwards and Briers (2001) asks and answers questions such as, "What do cooperating teachers perceive to be important elements of the student teaching experience as determined by focus groups?" as well as, "What do cooperating teachers perceive to be important elements of the student teaching experience?" It is important to continue research pertaining to career decisions in all majors to keep up with the ever changing views of each generation.

In order to turn out a significant number of graduates who have the desire to pursue agriculture- and animal-related jobs, departments must first establish an interest in agriculture among the students. By surveying former animal science students about their educational experience in the Department of Animal Science, researchers will be able to evaluate and adjust the curriculum and teaching methods to promote the desire among students to enter agricultural careers after graduation.

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APPENDIX: INSTRUMENT

The Animal Science Department is conducting a thorough review of our curriculum to make certain we are teaching our undergraduate students in a manner to adequately prepare them to launch and sustain their various career paths. We also want to be certain we are adequately serving our various livestock and allied industries, as well as graduate and professional schools. As a result, we highly value the input of former students of our Animal Science program about various academic issues, and we ask you to honestly answer the questions in this survey. The results of the survey will be reported later in 2010 through our departmental newsletter and posted on our departmental web page. Answers from all former students will remain anonymous.

Please provide the following information:

1. Name (optional)
2. Year that you graduated from Texas A&M University
3. Are you male or female
4. Background or previous experience with livestock or agriculture before entering Texas A&M University
1 (None), 2 (Limited i.e. classes, field trips, etc.), 3 (Some – 4-H/FFA projects, etc.), 4 (Experienced - worked with farm animals/on livestock operations several times), 5 (Very Experienced – grew up and/or worked full time for livestock operation)
5. Did you transfer into Texas A&M University
6. Did you attend professional or graduate school after completing your B.S. at Texas A&M University
7. Did you complete an internship while a student at Texas A&M University
8. Are you currently working in a career area directly related to your undergraduate degree

Opinions about Animal Science Undergraduate Program and Curriculum:

Indicate your opinion about the following statements on a 1 to 5 scale where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
Most ANSC courses relied too much on memorization as opposed to understanding concepts					
The ANSC degree program would have been better if it had incorporated more business management type emphasis					
Specialized certification options such as equine science, meat science, beef cattle science, etc. would be useful in ANSC program					
Exposure to more research opportunities would have been desirable					
ANSC students need knowledge and experience with basic animal husbandry (i.e. animal handling techniques, animal behavior, etc.) as part of the curriculum					
Scenario-based case studies are useful to incorporate into ANSC courses					
My level of interaction with my academic advisor(s) was adequate					
Animal science programs should include information about animal welfare and animal rights					
The ANSC program adequately prepared me for my career path					
The option to emphasize companion animals should be incorporated into the ANSC program					
Information about current and emerging issues in livestock					

industries is important in an ANSC curriculum					
Courses in the ANSC curriculum were arranged in a meaningful order					
Use of and access to live animals is important for ANSC courses and its curriculum					
The information gained from a college course is more important than the grade received					
The ANSC curriculum and/or courses emphasized creativity					
Emphasis on work ethic is important for ANSC students					
Emphasis on livestock production and the Texas and U.S. livestock industries is important for ANSC students					
Emphasis on integrity and character are important for ANSC students					
Exposure to producers and industry leaders through ANSC courses is important					
Emphasis on communications skills such as writing and oral presentations directly related to ANSC course materials is important					
Exposure to international internship, education and/or career options is important for ANSC students					

List any particular animal science courses during your undergraduate career you thought were:

A. Very useful

B. Not useful

List any particular required courses that were not animal science courses during your undergraduate career you thought were:

C. Very useful

D. Not useful

You may use the space below (or additional space if needed) to provide additional information or opinions about the undergraduate Animal Science program at Texas A&M University, or to elaborate on any of the questions above.

VITA

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