

# Elements and Analysis of an Internship Program in Animal Sciences



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## Abstract

The purpose of this paper is to describe the organization, management, and outcomes of an internship program in Animal Sciences. The goals of the internship experience are to provide an experiential learning opportunity for students to apply the concepts, knowledge, and skills gained during their undergraduate education to real world situations as they connect theory with practice. The internship experience provides students an opportunity to enhance written and oral communication skills, improve critical thinking skills, and promote awareness of community and societal issues while increasing student marketability for employment. The internship program is administered online through a course management system. The majority of internships were completed during summer quarter by students of senior rank. Eighty-four percent of internships were local and less than 6% of students completed more than a single internship for academic credit, with students completing multiple internships participating in longer internship experiences ( $P < 0.001$ ). Veterinary internships represented 21.3% of all experiences, followed by food animal production (20.0%), and research (18.3%). Within animal industries, dairy cattle internships dominated (40.8% of total food animal production internships). According to graduate surveys, 94% of survey respondents rated the internship as valuable and 28.6% of respondents were offered full-time employment by the internship organization ( $P < 0.001$ ).

## Introduction

Over the last four decades, the prevalence of internship programs in academia has increased (Hurst and Good, 2010; Katula and Threnhauser, 1999). Originally criticized on the grounds of academic merit (Santarino and Rogers, 1979), internships are now a familiar element of the academic experience and it is estimated that three in four students participate in an internship prior to graduation (Coco, 2000). The benefits of an internship extend through the

student, host organization, and academic institution. Internships provide a realistic understanding of the organization, structure, and expectations of a chosen profession; support the transition from student to professional; and promote networking opportunities that establish professional relationships (Parilla and Hesser, 1998; Ryan and Cassidy, 1996). In addition, internships encourage application of knowledge and technical skills and integrate these competencies with the broader goals of academic programs that include critical thinking, problem solving, and communication abilities (Gault et al., 2000; Hurst and Good, 2010; Sterns et al., 2005). For the internship experience to capture the learning potential and move beyond work for credit criticism, internship programs require structure that ensures work experience is coupled to intentional learning that is self-directed and self-reflective (Katula and Threnhauser, 1999; Ryan and Cassidy, 1996). To this end, the College of Food, Agricultural, and Environmental Sciences of The Ohio State University established a mandatory internship program to enhance the quality of undergraduate education by promoting hands-on, career related experiences that allow students to put into practice the concepts, knowledge, and skills gained during their undergraduate education. Student interns engage in self-directed learning that encourages the connection of classroom knowledge to real world experiences and reflection to reinforce learned concepts and ground theory with practice. Although there are exhaustive reports of internship programs in the literature, reports center on business and marketing internships (Clark, 2003; Gault et al., 2000; Hurst and Good, 2010) and less information is available concerning the implementation and value of programs in science related disciplines. The purpose of the article herein is to document the implementation of an animal sciences undergraduate internship program, characterize the student interns and their experiences, and report the perceived value of the internship experience to postgraduate career decisions.

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## Methods

### Internship Structure

Completion of an internship is a degree requirement for the animal sciences major. Students are evaluated on a satisfactory/unsatisfactory basis for award of academic credit according to the number of internship hours completed in the quarter system. Students may earn three credits for completion of 200 h, four credits for 300 h, or five credits for 400 h of work experience. Internship credits are repeatable to a maximum of 10 credits. Consultation with an academic advisor and prior approval of the internship experience through submission of an internship proposal is mandatory. Student performance is monitored by student submission of activity reports, which summarize internship responsibilities, time dedicated to these responsibilities, knowledge and skills learned or used, and proficiency level evaluated on a five-point response scale. A similar five-point response scale is used for the intern evaluation report, which rates students' professionalism, knowledge, initiative, and quality of work and documents the interns strengths and areas for improvement as discussed between the employer and intern. At the conclusion of the internship, a detailed report that includes reflection on the value of the experience is submitted. An oral presentation followed by a question and answer session is scheduled for an audience of peers. Satisfactory completion of the internship report and presentation is required to earn academic credit for the experience. Faculty and staff supervisors provide individual guidance for student interns and are responsible for assessing satisfactory completion of the requirements.

A faculty coordinator is responsible for program oversight and administering the program through the universities online course management system (CMS). Students are required to use the CMS to complete the internship. Management tools within the CMS restrict student access of program requirements until first completing an internship orientation. The orientation is linked to a quiz tool that assesses student awareness of the program and a score of 80% on the quiz is required to remove site restrictions. Program metrics are monitored through the CMS. The online content provides animal sciences majors continual access to the programs mission, guidelines, and requirements. The CMS also provides access to internship opportunities, career services, and graduate and professional school information. Internship opportunities reflect a comprehensive database of over 500 organizations that have previously participated in intern hires or

have contacted program personnel with interest in hiring an intern. The database is provided for contact purposes and positions not listed may be considered for internship credit as well. Internship experiences in general agriculture; food animal industries (aquaculture, beef, camelids, dairy, horse, pigs, poultry, sheep, and goats); breeding and genetics; business, sales, and pharmaceuticals; companion animals; conservation and wildlife management; meat and food science; nutrition; research; veterinary medicine; zoos and aquariums; outreach and education; and public and health policy are advertised. The database is updated continually to reflect new or dissolved internship positions.

### Program Assessment

This study used data collected from existing records of animal sciences students ( $n=734$ ) participating in the internship program between 2004 and 2010. Data was retrieved from internship records maintained by the Animal Sciences department and included: internship year, academic quarter and minimum hours completed, employment category, and internship location. Transfer status was determined from enrollment records. Students with less than 15 credit hours of course matriculation or who entered with proficiency examination credit were considered nontransfer students. The application of an online CMS for administering the program was assessed using the survey tool function of the CMS that was made available to students in 2006. A survey instrument developed to profile animal sciences graduates of The Ohio State University was used to determine perceived value and employment outcomes associated with internships. The online survey was sent to graduating seniors ( $n=184$ ) between 2009 and 2010 with a response rate of 48.9%. This study was deemed exempt by The Ohio State University Institutional Review Board.

Statistical analyses were performed by the Cochran-Mantel-Haenszel test to control for student and determine the associations between academic rank, transfer status, credit hours, and internship location using the PROC FREQ procedures of SAS (version 9.1; SAS, Cary, NC). The Rao-Scott chi-square test (PROC SURVEYFREQ) was used to estimate response frequencies to survey questions. Mean responses to CMS survey questions were compared by ANOVA using the mixed model (PROC MIXED) procedures of SAS appropriate for random nested effects. Data are presented as means  $\pm$  SEM with  $P \leq 0.05$  considered significant. No identifying information was used in data analysis.

## Results and Discussion

Benefits of internships for students, host organizations, and academic institutions are well documented (Gault et al., 2000; Hurst and Good, 2010; Parilla and Hesser, 1998; Ryan and Cassidy, 1996; Sterns et al., 2005). Despite the recognized benefits, the time investment required by personnel to govern internship programs can be a limiting factor in their implementation (Hanson, 1984). Similar to a previous report (Hanson, 1984), the internship program discussed herein was maintained by the concerted efforts of an internship coordinator as well as faculty and staff supervisors; however, informational and administrative components of the program were delivered through a CMS. The hybrid structure preserved the academic integrity of the program while reducing face-to-face contacts associated with a mandatory program that involves diverse internship interests and continual student participation. Survey data retrieved suggests that an internship program can be effectively administered online. Students expressed greatest agreement with questions concerning expectations of the program and awareness of internship opportunities ( $P = 0.03$ ; Table 1). While there was less agreement on program orientation, a generally positive consensus was reached. Survey findings also provide evidence that the CMS is an effective technology for increasing career services and occupational awareness.

Course management system survey findings should be interpreted cautiously, however, due to the low response rate of 3.3%, which was determined from the ratio of completed surveys to the number of students completing an internship. Factors contributing to survey response rates are complex and include

subject demographics, mode of survey administration and confidence in anonymity, survey topic, incentives, and engagement (Porter and Whitcomb, 2005). It is likely that these same variables influenced the low response rates in the current study. Indeed, survey participation was voluntary, respondents were not solicited, and incentives were not provided. It is generally accepted that survey bias is increased with increased nonresponse rates, however, the relationship between nonresponse rates and survey quality is tenuous (Krosnick, 1999). Although low response rates increase the likelihood that responders are not representative of the population in question, data obtained from surveys with high response rates may equally misrepresent the population (Asch et al., 1997; Krosnick, 1999).

## Instructional Strategies for Assessing Internships

Instructional strategies that promote and assess student learning underscore the academic value of an internship program. Various instructional methods are reported in the literature for ensuring internship effectiveness in the context of academia (Clark, 2003; Parilla and Hesser, 1998; Santarino and Rogers, 1979). The internship program reported herein uses written proposals, activity and evaluation reports, formalized oral presentations, and a culminating final report for assessment. Proposals are an important tool in framing the nature of the relationship between the intern and site supervisor (VonDras and Miller, 2002). The proposal serves as a contract that clarifies the expectations of the internship. Specific learning objectives, skills and knowledge to be gained, and responsibilities are detailed and provide realistic goals

**Table 1: Summary of responses to CMS survey statements from The Ohio State Universities Animal Sciences department internship program between 2006 and 2010**

Statement	Response, % <sup>2,3</sup>					Mean Response
	1	2	3	4	5	
The Internship Orientation provided useful information.	5.6	0.0	22	44	28	3.9 ± 1.0
I understand what is expected for successful completion of the internship requirement.	0.0	0.0	0.0	67	33	4.3 ± 0.5
There are a variety of internship opportunities to explore my career interests.	0.0	0.0	5.6	56	39	4.3 ± 0.6
Occupational Awareness contained information that increased my awareness of careers available in Animal Sciences.	0.0	0.0	28	61	11	3.8 ± 0.6
I am more aware of the career services available at OSU.	0.0	5.6	11	72	11	3.9 ± 0.7
The Career Planning Resources were helpful.	0.0	11	22	44	22	3.7 ± 1.2
The Basics of Interviewing provided useful information on what I can expect during the interview process.	0.0	5.6	22	56	17	3.5 ± 0.6
I will continue to use the resources available on the CMS even after I have completed my internship.	0.0	11	11	56	22	3.9 ± 0.9

<sup>2</sup>Respondents (n=18) used a five-point response scale rating system: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree.  
<sup>3</sup>Chi-square analysis for distribution of responses  $P = 0.03$ .

toward which progress can be measured. Establishing learning objectives encourages active participation in the learning process, assists students in clarifying their individualized goals, and increases the likelihood of learning outside the classroom (DeVuyst, 2006; Parilla and Hesser, 1998). Activity reports document the responsibilities and tasks completed and assess progress. In addition, these reports are an opportunity to ensure communication is maintained between the intern and the academic community. Meaningful learning is said to be compromised when students are removed from communication with the university (Bulger, 2006). The intern evaluation report reinforces the learning experience through feedback, which is considered a cornerstone of learning when it identifies strengths and suggests areas for improvement (Coco, 2000; Orrell, 2006). An oral presentation and culminating final report guide student reflection of the experience. Specifically, interns communicate both technical and social skills that were used or acquired, previous academic knowledge that contributed to their success, and areas where academic preparation was inadequate. The instructional strategies used facilitate meaningful reflection, and in agreement with others (Clark, 2003; DeVuyst, 2006; Parilla and Hesser, 1998), are of great academic value as students are directed to comprehend the importance of their experience and connect it with knowledge previously learned in the classroom.

**Profile of Internship Experiences**

The majority of students conducted internships during the summer quarter (78%), with lesser participation during autumn (5.6%), winter (6.0%), and spring (10%) quarters when students were dedicated to traditional classroom instruction (Table 2). This is in agreement with Clark (2003), who reported that while students engaged in part-time internships throughout the academic year, most were completed during summer when more time could be dedicated to work. Intern employers also report this time of the year as most valuable for an internship hire (Fenwick and Gartin, 1990). Summer internships can lead to more rewarding opportunities as students do not need to divide time between these hands-on-experiences and the classroom. Gavigan (2010) contends that financial assistance is an important consideration for summer internships as students are unable to participate in these learning experiences without a stipend. In the current study, it was at the student’s discretion to complete a volunteer or compensated internship. The association between compensation and time of internship completion is not known, however, a previous report

*Table 2: Profile on internships completed by Animal Sciences majors of The Ohio State University between 2004 and 2010*

Variable	Number	Percent
Academic rank <sup>z</sup>		
freshman	7	1
sophomore	69	14
junior	159	31.4
senior	271	53.6
Quarter conducted		
autumn	41	5.6
winter	44	6.0
spring	75	10
summer	574	78.2
Minimum hours completed <sup>y</sup>		
200	346	49.1
300	44	6.2
400	315	44.7
Internships completed <sup>x</sup>		
1	639	94.7
2	34	5.0
3	2	0.3
Location <sup>w</sup>		
Local	612	84.2
National	111	15.3
Global	4	0.6

<sup>z</sup>Academic rank is reported for nontransfer students (n=506). Students with less than 15 credit hours of course articulation or who entered with proficiency examination credit are considered nontransfer students.

<sup>y</sup>Students complete a minimum of 200 h for three credits, 300 h for four credits, or 400 h for five credits.

<sup>x</sup>Numbers for internships completed reflect number of students.

<sup>w</sup>Internships have been conducted across 36 states and three countries.

(Fenwick and Gartin, 1990) showed that students in agriculture ranked financial compensation as the least important of the benefits associated with an internship program. Furthermore, unpaid internships are common throughout various employment sectors as students are willing to work without financial compensation for career development and academic credit (Lipka, 2008).

There was no prerequisite academic standing or coursework required for conducting an internship, which was in contrast to other reports (Ross and Elechi, 2002; Von Dras and Miller, 2002; Campbell and Kovar, 1994; Santarino and Rogers, 1979). While students completing internships within the first two years of attending the university may not have the breadth of academic knowledge relative to their more senior peers, the internship can serve as a catalyst to a more in depth investigation of a subject. In addition, students participating in internships earlier in their academic career would have greater opportunity to pursue multiple internships prior to graduation. Indeed, a previous study indicated that students were interested in completing multiple internships prior to graduation (Davis and Williams, 2004) and media suggests a rising trend toward multiple internships;



## Elements & Analysis of Internship

**Table 3: Associations of academic classification and number of internships completed with internship length and location**

Variable	Minimum hours <sup>y</sup>				Percent <sup>z</sup>		Location		
	n	200	300	400	P-Value	Local	National	Global	P-Value
Rank <sup>x</sup>									
Freshman	8	62.5	12.5	25.0		75.0	25.0	0	<0.001
Sophomore	70	41.4	8.57	50.0		78.6	21.4	0	
Junior	159	42.8	3.77	53.5		77.7	22.3	0	
Senior	271	52.0	6.27	41.7		90.0	8.92	1.12	
Transfer status <sup>w</sup>									
Yes	192	53.1	6.77	40.1		84.3	15.1	0.60	
No	508	47.4	5.93	46.4		83.7	15.8	0.53	
Internships completed <sup>v</sup>					<0.001				
1	671	50.7	6.11	43.2		84.0	15.4	0.58	
2-3	34	18.8	9.38	73.5		88.2	12.5	0	

<sup>z</sup> Cochran-Mantel-Haenszel analysis of association.  
<sup>y</sup> Students complete a minimum of 200 h for three credits, 300 h for four credits, or 400 h for five credits.  
<sup>x</sup> Academic rank is reported for nontransfer students.  
<sup>w</sup> Students with less than 15 credit hours of course articulation or who entered with proficiency examination credit are considered nontransfer students.  
<sup>v</sup> Data for internships completed were coded to represent the first, second, or third internship experience.

however, there is insufficient data in the literature to support. Findings of the current study revealed that less than 6% of students completed two or three internships (Table 2). It is not known why such limited number of students pursued multiple internships in view of academic programs recommending the practice (Clark, 2003). While the allowance of short duration internships provide flexibility to pursue multiple internships, it is unlikely that the length of the internship was a contributing factor. Students completing multiple internships were more likely to participate in longer individual internship experiences ( $P < 0.001$ ; Table 3). Furthermore, most internships (53.6%) were completed by students of senior standing (Table 2). It should be noted that the study only captured students that completed internships for academic credit. It is plausible that more students completed a second or third internship independent of academic credit once the degree requirement was fulfilled, but these numbers would be limited due to most students not fulfilling the requirement until their senior year.

The majority of completed internships were local (84.2%), with national and global internships representing lesser percentages of total internships (Table 2). The factors that influence student decision in internship site selection may underscore limited participation in national and global internships. It is well established that selection of an internship site requires careful consideration to achieve both experience and learning (Campbell and Kovar, 1994). Students tend to seek internship sites that promote career exploration and training in a supportive environment;

however, schedule flexibility and convenient location also are important factors in selection (Parilla and Hesser, 1998). Internship sites in the current study were established through faculty and student contacts, similar to other published reports (Fenwick and Gartin, 1990; Santarino and Rogers, 1979). While a number of local and national internship sites were made available to students, only four international internship sites have been established. International internships facilitate meaningful learning experiences and are a common form of curriculum globalization

(Forsberg et al., 2003). However, prior involvement of faculty with international communities that support the mission of the internship program in an academic context are considered essential to program success and are a limitation for global internships (Engstrom and Jones, 2007) as observed in the current study.

Veterinary internships represented 21.3% of all experiences, followed by food animal production

**Table 4: Characteristics of internships completed by Animal Sciences majors of The Ohio State University between 2004 and 2010**

Variable	Number	Percent
Category		
Agriculture <sup>z</sup>	6	0.8
Food Animal industries <sup>y</sup>		
Beef cattle	38	5.2
Dairy cattle	60	8.2
Poultry	16	2.2
Pigs	28	3.8
Sheep	3	0.4
Companion animals <sup>x</sup>	57	7.8
Conservation and wildlife management	31	4.2
Horse	71	9.7
Llama	2	0.3
Meat and food science	26	3.5
Nutrition	9	1
Research <sup>w</sup>	134	18.3
Veterinary	156	21.3
Zoo and aquarium	31	4.2
Other <sup>v</sup>	66	9.0

<sup>z</sup> Positions excluding animal agriculture

<sup>y</sup> Animal industries represented 147 (20.0%) of internships completed.

<sup>x</sup> Includes positions in behavior and training, animal therapy and service, and kennel and shelter work.

<sup>w</sup> Forty-eight percent of research internships were supported through departmental and college funding initiatives to promote research opportunities within the undergraduate curriculum.

<sup>v</sup> Included positions in business (n = 36), education (n = 3), extension (n = 19), human health (n = 5), pharmacy (n = 2), and politics (n = 1).

*Table 5: Summary of responses to selected statements from The Ohio State Universities Animal Sciences department 2009-2010 graduating senior survey*

Statement	n	Response, %		SE
		Yes	No	
My internship was valuable in helping me to decide what I want to do with my life.	90	94	5.9	2.2
My internship employer offered me a full-time position after the completion of my internship.	90	29	71	4.2

Chi-square analysis for distribution of responses  $P < 0.001$

(20.0%), and research (18.3%) (Table 4). Within animal industries, dairy cattle internships dominated (40.8%). Previous reports have reflected on the increased number of students enrolled in animal sciences with career interests in veterinary medicine (Lyvers Peffer, 2010), which is likely to contribute to the decisions to pursue an internship in this field. The number of internships conducted in food animal industries, however, was surprising. Less than 10% of animal sciences students enrolled in introductory courses reported career interest in food animal production (Lyvers Peffer, 2010). The decision to pursue internships in this area likely reflects either a means to diversify animal experiences in preparation for veterinary school admissions or shifting career interests. Participation in undergraduate research experiences was expected. The benefits associated with undergraduate research have been extolled in reports elsewhere (Bauer and Bennet, 2003; Lopatto, 2003) and involvement generally aligns with students decisions for postgraduate education (Lopatto, 2004).

**Student Perception Internship Value**

According to Neapolitan (1992), internships are valuable experiences for solidifying career choices by clarifying expectations of the profession. Students who are indecisive as to career choice report gains in certainty of career decisions following completion of an internship (Neapolitan, 1992). In the current study, 94% of survey respondents rated the internship as valuable to decision-making and their future and 28.6% of respondents were offered full-time employment by the internship organization ( $P < 0.001$ ; Table 5). Post-graduate career success is a primary aim of undergraduate programs and internships are an important tool to this end. Assessments of undergraduate internship completion and employment at graduation show that internships are one of the most valuable experiences toward early career success (Callanan and Benzing, 2004; Krouse et al., 1999). This association reflects not only the benefits of internships on the student, but the direct value to employers as well. An increasing number of employers are using internships as recruiting tools. Interns bring new perspectives to an organization and deliver current

knowledge, while employers gain access to highly motivated individuals and are given the opportunity to evaluate their employment potential within the context of the company (Hurst and Good, 2010). According to the National Association of Colleges and Employers (2011), 40% of new college hires will stem from internship and co-op programs. Less than 30% of respondents in the current study reported full-time employment offers. Although these findings may be confounded by the students’ academic rank at the time of the internship, data are in agreement with previous reports where 33% of interns report job offers (Fenwick and Gartin, 1990).

**Summary**

The benefits of internships toward enhancing traditional classroom instruction are well documented. This study discusses the instructional strategies that are available to guide students in self-directed learning and reflection to ensure academic integrity of internship programs and demonstrates that such programs can be administered online. While animal sciences students pursue internships across diverse professions, the majority elects to complete internships locally and only limited numbers of students complete multiple internships for academic credit. The perceived value of an internship toward helping students elucidate their future goals warrants integration of internships in college curricula.

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