**High Impact Practices and Their Effect on
Beginning Career Outcomes in Agriculture**

by

Elizabeth A. Mooneyham

A thesis submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Agricultural Business and Economics, Master of Science

Auburn, Alabama
August 3, 2024

Approved by

Dr. Mykel Taylor, Chair, Associate Professor & Alfa Eminent Scholar,
Agricultural Economics & Rural Sociology
Dr. Amy Wright, Associate Dean for Instruction & Professor, Horticulture
Dr. Sunjae Won, Assistant Professor, Agricultural Economics & Rural Sociology

Abstract

High impact practices (HIPs), which are offered to undergraduates at Auburn University, help build both soft and hard skills that these employers stated they are seeking from candidates in today's job market. The Auburn University College of Agriculture invests resources into helping students become well-rounded individuals ready to enter the workforce or continue in academia. With a thriving job market for agriculture graduates, it is important to understand if HIPs help equip graduates for their next steps. The First Destination Survey is a conventional practice for colleges and universities across the world. It gives insight on graduates' employment activities in the first six months post-graduation. It also may give insight on potential gaps in academic and professional development opportunities during college. Our research objective is to determine whether HIPs have a statistically measurable impact on the probability of College of Agriculture students becoming gainfully employed or continuing education through graduate or professional school within six months of graduation. HIPs in the First Destination Survey at Auburn University include e-Portfolios, study abroad experiences, internships, undergraduate research, and co-ops. We obtained First Destination Survey data from Auburn University College of Agriculture. The data consists of 730 observations on students who graduated from 2020 to 2022.We use a logit model where the outcome variables are securing full time employment or attending continuing education within six months of graduation. Our control variables include academic major, GPA, HIPs, and demographic information. Results will inform College of Agriculture students of the value of HIPs in successfully securing employment in their chosen field. The results of the study show positive statistically significant results for participating in at least one high impact practice for continuing education or becoming gainfully employed within the first six months after graduation.

Acknowledgments

I would like to express my sincere gratitude to my thesis committee: Dr. Mykel Taylor, Dr. Amy Wright, and Dr. Sunjae Won. Thank you for believing in me and going above and beyond to help me produce this work. I would especially like to thank my major professor, Dr. Mykel Taylor. I have truly enjoyed the privilege of working with you on this project.

I want to thank my best friend, Kacie Baxley, for being my rock and sounding board throughout this process. I'm so grateful for you.

Lastly, I would love to thank my parents, Lori and Jeff Mooneyham. I could not have done this without your support, encouragement, and occasional tough love. I am eternally grateful for your sacrifices that allowed me to continue my education.

Table of Contents

List of Tables

List of Abbreviations

AAC&U   American Association of Colleges and Universities

Co-op   Cooperative education programs

GPA   Grade Point Average

HIP   High Impact Practice

NACTA   North American Colleges and Teachers of Agriculture

SCCT   Social Cognitive Career Theory

STEM   Sciences, Technology, Engineering, And Mathematics

Introduction

The agricultural industry has been in high demand of employable graduates for decades. However, employer desirable skills for graduates are constantly evolving. The agricultural industry of today is vastly different than many outside the industry perceive. Klein (1990) cites two major changes in the agriculture industry that are still true today. First, a very small share of students tends to go into the farm production sector of the industry. Most work in a more consumer-based capacity. Second, the food and agriculture industries work on a broad, world market system. Students studying agriculture learn a variety of hard and soft skills to prepare them for the workforce. In addition to technical skills required for the next step in their career, students also learn soft skills like communication, time management, dependability, and more. However, these soft skills are often not taught in the classroom. Studies of the desirable qualities of graduates from industry professionals strongly indicate the value of interpersonal and problem solving skills (Andelt, Barrett, and Bosshamer 1997; Klein 1990; Robinson, Garton, and Vaughn 2007) Additionally, Klein (1990) emphasizes the importance of teaching students how to "think and react in a problem solving context" to prepare students for employment.

The previous studies, however, focus on curriculum change and enhancement as the primary goal in increasing employability. This study aims to elaborate on the positive impacts on employability that students can achieve from participation in high impact experiences within the agriculture industry. Research studies in higher education support the encouragement of high impact experiences (Kuh 2008; Miller, Rocconi, and Dumford 2018; Vetter and Wingenbach 2019).

The goal of our study is to evaluate the importance of participating in high impact experiences to obtain full time employment or continue their education in graduate or

professional school within the agricultural discipline. The influence of high impact practices on early career outcomes have been documented in past decades before and after their official designation in 2007 by the Association of American Colleges and Universities. This paper will attempt to supplement previous research by expanding on the influence of high impact practices on early career outcomes within the agricultural discipline. In many previous higher education studies, agricultural majors are typically dropped from the sample because of the low share of overall prevalence in higher education. However, we believe that this is still a very important discipline to examine. According to Feeding the Economy, the food and agriculture sector accounts for approximately 15% of all U.S. employment and $9.6 trillion of the country's economic activity. In Alabama, over 650,000 jobs fall under the food and agriculture sector with an estimated output of $123.8 billion. The United States Department of Agriculture and Purdue University predict a steadily strong job market for college graduates studying food, agriculture, renewable natural resources and the environment (Fernandez et al.).

Literature Review

Extensive literature on the relationship between early career outcomes and college education has been developed over the past several decades. Most of this work has named economic outcomes, such as wages received for a specific major, as the most important marker of a successful early career outcome. This study uses data collected from Auburn University's First Destination Survey with emphasis on the career outcomes within 6 months of graduation. Therefore, due to the nature of the survey, data on wages received was not collected.

The first destination of graduates is a powerful performance indicator for institutions with the goal of preparing the next generation of the workforce. Performance indicators use empirical data to describe the effectiveness of a higher education institution (Bruwer 1999). Performance

indicators are often used to inform management decisions of academic institutions. There are many different researched ways to go about analyzing the effectiveness of an institution and the preparation of their graduates for the current labor market. In all, the goal of evaluating performance indicators will be to consider the purpose, goals, and outcomes of an institution.

Theoretical Framework

The importance of high impact experiences cannot be understated in helping students find interest in fields of study and particular interests in personal, academic, and professional topics. Within the agricultural discipline, experiences both inside and outside the classroom help expose students to new and innovative ideas. Agricultural students come from a variety of backgrounds and their experiences with agriculture are all different. In an article published in 2015 by North American Colleges and Teachers of Agriculture, researchers found that students who choose to study agriculture and food related STEM majors indicated that passion for their career and job security were important factors in that decision (Hegerfeld-Baker et al. 2015). The findings in this article are in support of the Social Cognitive Career Theory (SCCT) introduced by Robert Lent, Steven Brown, and Gail Hackett (2002). In addition to Kuh's (2008) research on high impact practices, SCCT serves as the driving theoretical framework for this study.

SCCT proposes that interests, outcome expectations, self-efficacy beliefs drive academic and career interests, and objective ability may or may not match these interests and beliefs (Lent, Brown, and Hackett 2002). Self-efficacy beliefs are acquired and modified via personal performance accomplishments, vicarious learning, social persuasion, and physiological and affective states (Bandura 1997). Students choose academic majors based on their interests, if they can perform well, and they believe pursuing a particular career will provide the outcomes they desire. The SCCT theory states having "positive experiences in career related activities and

the aptitude to do well in specific careers makes it more likely that people will develop robust efficacy expectations and positive outcomes for these career pursuits" (Lent, Brown, and Hackett 2002). Additionally, the model implies that students will not pursue careers they may be otherwise well-suited for because they have not been exposed to positive learning experiences relating to that career (Lent, Brown, and Hackett 2002).

The SCCT's career choice model emphasizes the fluidity personal agency in the decision-making progress. Lent, Brown, and Hackett divide the subsequent model into three parts:

1. The expression of a primary choice (or goal)

2. Actions, such as enrolling in a particular training program that is designed to implement one's choice

3. Subsequent performance attainments (successes, failures) that form a feedback loop, affecting the shape of future career behavior

The steps outlined above support this study's claim on the importance of high impact experiences. Students have autonomy to make their own expression of a primary choice. Higher education institutions offer various avenues for students to further explore their primary choice, interests, self-efficacy beliefs, and outcome expectations. These avenues include high impact experiences in addition to countless other social, academic, and professional opportunities. After exploring these avenues, students form a feedback loop on likes, dislikes, and abilities to further shape their career behavior. However, SCCT explains that students' perception of achievement can negatively impact their career behavior. For example, students may not choose the major they are most interested in if they perceive significant barriers to success in that industry that does not align with their outcome expectations (Lent, Brown, and Hackett 2002).

High Impact Practices and Experiences

The American Association of Colleges and Universities and Dr. George D. Kuh were instrumental in the development of the compilation of high impact practices that are used by-and-large by the higher education discipline. Originally, ten high impact practices were outlined: first year seminars and experiences, common intellectual experiences, learning communities, writing-intensive courses, collaborative assignments and projects, undergraduate research, diversity/global learning, service or community-based learning, internships, and capstone courses and projects (Kuh 2008). While Auburn University employs all these high impact practices in some form, the College of Agriculture is most interested in the five practices that are included in the First Destination Survey. The First Destination Survey that is administered by Auburn University includes queries about participation in the following high impact practices: e-Portfolio, internship, undergraduate research, co-op, and study abroad.

There are many individual benefits to each of the AAC&U's eleven high impact practices. However, there are general benefits seen across all eleven practices. First, high impact practices require a considerable amount of time and effort beyond what is generally required of students. The extra time and effort lend to a deeper understanding and connection with learning materials over an extended period. High impact activities also typically require interaction with faculty and other peers. Participation from early on in college fosters more meaningful engagement and effective feedback over the course of students' academic career. Diversity is also an important hallmark of high impact experiences. Through experiences like study abroad, service learning, and even internships, students work side-by-side with individuals who are different from themselves.

George Kuh (2008) recommended students participate in at least two high impact activities during their undergraduate programs, one in their first year, and one major-related later in their program in order to optimize achievement. While the First Destination Survey at Auburn University only queries participation in some of the high impact learning practices, all eleven are offered and encouraged at Auburn University. It is common for students to participate in multiple practices throughout their undergraduate program. This infuses an intellectual vitality among the student body that translates to further education, formal or informal, outside the classroom (Kuh 2008). Continued learning is a mindset of students who participate in these activities while in undergraduate programs and further develop soft and hard skills that make them more engaged in their field and more qualified and desirable candidates. High impact practices create a more widely experienced student regardless of other factors within the college experience.

High impact practices have been empirically proven to positively influence early career outcomes (Kuh 2008; Kuh, O'Donnell, and Schneider 2017; Watson et al. 2016; Twang 2022). The level of influence differs based on many factors. Studies conducted with samples across many disciplines found less overall impact, but instead claimed that specific experiences align with specific outcomes (Wolniak and Engberg 2019). However, STEM majors participating in HIPs had stronger influence on non-pecuniary outcomes such as first destination.

High impact practices develop a student's interpersonal and technical abilities. Employers across many studies and industries have conveyed that development of skills strongly associated with HIPs produces a more desirable workforce (Andelt, Barrett, and Bosshamer 1997; Klein 1990; Miller, Rocconi, and Dumford 2018; Parrella et al. 2024; Robinson 2006; Robinson, Garton, and Vaughn 2007; Vetter and Wingenbach 2019). Many of the existing

studies examine high impact practices' effect on early career wages. While this is a highly important factor in examining early career outcomes, our study instead examines how high impact practices are enabling students to take the next step in their career: full time employment or continuing education.

Undergraduate research can provide meaningful experience for students of all disciplines, but the prevalence of undergraduate research opportunities seems to lie within the science discipline. The goal of undergraduate research is to "involve students actively with contested questions, empirical observation, cutting-edge technologies, and the sense of excitement that comes from working to answer important questions" (Kuh 2008). Undergraduate research exposes students to the empirical method early on in their program. Research opportunities expose students to the scientific process, new technologies, and the enthusiasm for research that often translates into a graduate program for that student (Kuh, O'Donnell, and Schneider 2017). This enthusiasm for research could result from previous interest of the student, or the exposure to the empirical method sparked a new interest in a student.

Study abroad offers the opportunity for students to experience cultures and education different than they are familiar with (Kuh, O'Donnell, and Schneider 2017). Auburn University and the College of Agriculture offer many different forms of study abroad across most disciplines. These opportunities are available to those seeking trips from one week to an entire semester. Financial assistance is also available to students seeking study abroad opportunities. By and large, studying abroad is available to most students at Auburn University.

Internships are a prevalent experience in college for most students. Internships are designed to provide direct work experience that aligns with a student's interests or course of study. In some cases, an internship is also taken for course credit including a project overseen by

a faculty member. Internships can also translate into full time employment upon graduation for some students.

Cooperative education programs (co-op) are a type of work-integrated learning that is most prevalent among STEM majors. These experiences incorporate student interest and academic pursuits into an experience that enhances learning opportunities through creating a meaningful work environment. Supervisors and other employees hosting a co-op student typically serve as career mentors and increase levels of professional socialization (Nevison et al. 2017).

In 2016, Watson, Kuh, Rhodes, Light, and Chen, designated an eleventh high impact practice: e-Portfolios. In the agriculture discipline, employers seek graduates with practical knowledge and skills that can be applied immediately. E-Portfolios serve as a way for students to display to employers their ability and breadth of knowledge across many subjects. It is also a beneficial way to identify relevance of topics and knowledge gaps within tertiary education. Students with a structured e-Portfolio experience in college typically exhibit outcomes similar to other designated high impact practices (Watson et al. 2016). However, students across twelve majors within the College of Agriculture completed an e-Portfolio within our sample. The majors with the highest frequency of e-Portfolios include Poultry Science (Production) (20), Agricultural Business and Economics (15), Horticulture (13), and Agricultural Communications (12).

Data and Methodology

The data for our study is composed of 730 observations and was recorded via Auburn University's First Destination Survey. Data recorded from College of Agriculture students who graduated during 2020, 2021, and 2022 were obtained from the Auburn University Office of the

Provost in January 2024. For this study, cohort year is defined as the graduating classes from summer, fall, and spring semesters. Auburn University's First Destination Survey practices have been nationally recognized by the National Association of Colleges and Employers. First Destination Survey responses are required for graduates to obtain the physical copy of their diploma leading to a knowledge rate of 99.6% for the class of 2021 (2022). The sample is composed of approximately 60.8% freshman admission and 38.4% transfer admission. Gender is evenly distributed in the sample with the cumulative makeup being 48.1% male and 51.9% female. Per cohort year, the distribution remains relatively even with males being 54% of the sample in 2020, 46.1% in 2021, and 43.9% in 2022. The race distribution of the sample pool is predominately comprised of white students 87.3%. The next largest racial population is Black or African American (4.2%) and Hispanic (3%). Additionally, College of Agriculture undergraduate degree-earning students tend to be United States citizens making up 97.9% of the sample.

In addition to the demographic information provided above, the First Destination Survey also captures background information such as if the student is a first-generation college graduate, if they were Pell Grant eligible, and if they were admitted to Auburn as a freshman or transfer student. Students who qualify for a Federal Pell Grant display exceptional financial need and have not previously earned a bachelor's, graduate, or professional degree. Collectively, first-generation college students made up 22.6% of the sample. 30% of College of Agriculture graduates were Pell Grant eligible. Freshman admission represented 60.8% of the sample pool, and transfer admission made up 38.4% of the sample pool. There are 6 responses for a category titled Undergraduate (other). Since this response category makes up only 0.8% of the sample, it was combined with transfer admission for our models.

The College of Agriculture has over 20 academic major options for students, and many of these majors have specialization options for more broad subjects. All available options during cohort years 2020, 2021, and 2022 are included in our study. Animal Sciences has options for Allied Industries, Equine, Meat Science, and Pre-Vet. Crop and Soil Science has options for Production; Science; Soil, Water, and Land Use; and Turfgrass. Fisheries, Aquaculture, and Aquatic Sciences has options for Fisheries, Marine Resources Management, and pre-veterinary medicine track. However, there were no observations recorded for FAAS (Pre-Vet) for the cohort years examined. Therefore, it is not included in our study. Lastly, the Poultry Science major has options for Production and Pre-Vet. Additionally, we would like to note that the Biosystems Engineering and Horticulture majors offer specialization tracks for students, but these tracks are not differentiated in the First Destination Survey. Animal Sciences (Pre-Vet) and Agricultural Business and Economics represent the most students in our sample (24.5% and 17.4% respectively).

Students on a pre-veterinary track—Animal Sciences (Pre-Vet) and Poultry Science (Pre-Vet)—comprise the largest share of the sample with 191 observations accounting for 26.2% of graduates. These majors were combined into an additional variable title *prevet*. The majority of this data subset is female. Male students account for approximately 15.2% of the sample. This subset is also 83.2% white. First generation students make up 27.2% of the subset, and transfer students make up 23.4% of the subset. Pell Grant eligible students made up 26.7% of the students in pre-veterinary medicine track academic majors. The average cumulative GPA for pre-vet graduates was 3.24, and 54.97% of pre-vet graduates indicated continuing education was their final plan six months after graduation. The large share of the total sample was a large factor defining this subset. We compare the logit model results for students whose major indicated a

desire to attend graduate or professional school to the results for all other majors. The subset was created to preserve the integrity of the model. By controlling for pre-vet track students, we were able to analyze the effects of HIPs on all other majors' likelihood of going to graduate school or becoming gainfully employed.

Table 1
Pre-Veterinary Medicine Track
Descriptive Statistics

	2020		2021		2022		Cumulative	
Variable	Freq.	Pct.	Freq.	Pct.	Freq.	Pct	Freq.	Pct.
Gender								
Male	10	15.4%	8	13.6%	11	16.4%	29	15.2%
Female	55	84.6%	51	86.4%	56	83.6%	162	84.8%
Race								
White	52	80.0%	48	81.4%	59	88.1%	159	83.2%
American Indian or Alaska Native	0	0.0%	1	1.7%	0	0.0%	1	0.5%
Asian	1	1.5%	0	0.0%	1	1.5%	2	1.0%
Black or African American	7	10.8%	8	13.6%	1	1.5%	16	8.4%
Hispanic	4	6.2%	1	1.7%	1	1.5%	6	3.1%
Nonresident Alien	0	0.0%	1	1.7%	0	0.0%	1	0.5%
Race and Ethnicity Unknown	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Two or More Races	1	1.5%	0	0.0%	5	7.5%	6	3.1%
Citizenship								
United States Citizen	64	98.5%	58	98.3%	67	100.0%	189	99.0%
Not United States Citizen	1	1.5%	1	1.7%	0	0.0%	2	1.0%
First Generation Student Status								
First Generation Student	23	35.4%	14	23.7%	15	22.4%	52	27.2%
Not First Generation Student	42	64.6%	45	76.3%	52	77.6%	139	72.8%

Table 1

Pre-Veterinary Medicine Track

Descriptive Statistics

	2020		2021		2022		Cumulative	
Variable	Freq.	Pct.	Freq.	Pct.	Freq.	Pct	Freq.	Pct.
Pell Grant								
Pell Grant Eligible	23	35.4%	12	20.3%	16	23.9%	51	26.7%
Not Pell Grant Eligible	42	64.6%	47	79.7%	51	76.1%	140	73.3%
Admission Group								
Freshman Admission	46	70.8%	51	86.4%	49	73.1%	146	76.4%
Transfer Admission	19	29.2%	8	13.6%	18	26.9%	45	23.6%

$n = 191$

The purpose of this study was to evaluate the effect of high impact practices on early career outcomes within the agricultural discipline. For our sample, collectively 60.9% of College of Agriculture graduates participated in at least one high impact experience while 39.2% did not. 21.4% of the sample participated in more than one high impact experience during their undergraduate education. Internships and undergraduate research had the highest participation rates. 40.7% of graduates participated in an internship, and 23.2% participated in undergraduate research (see Appendix A). Students have multiple opportunities to engage in high impact experiences and this led to a diverse sample of students who participated in one, multiple, or no high impact experience.

Independent variables were selected to fulfill the research objective of evaluating what characteristics influence obtaining full time employment or continuing education the greatest. The demographic variables selected include race, gender, first-generation college student, freshman or transfer admission group, and Pell Grant recipients. By including first-generation

status, admission group, and Pell grant recipients, we are able to have a more complete demographic profile of students to determine if early career outcomes are associated with other factors outside of their performance in college (Robst 2007). Additionally, variables that describe a student's performance during college were considered. GPA and participation in high impact practices such as internships, e-Portfolios, undergraduate research, co-op, and study abroad were considered. Table 3 includes the cohort year distribution of the study in addition to average cumulative GPA and HIP participation percentages. This study utilized a logit model to model the relationship between categorical predictor variables and a categorical outcome. Also, using a logit model was selected for practical reasons due to the ease of interpretations of the results.

Table 2
Descriptive Statistics

Variable	2020		2021		2022		Cumulative	
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct	Freq.	Pct.
Gender								
Male	134	54.00%	117	46.10%	100	43.90%	351	48.08%
Female	114	46.00%	137	53.90%	128	56.10%	379	51.92%
Race								
White	214	86.30%	222	87.40%	201	88.20%	637	87.30%
American Indian or Alaska Native	3	1.20%	1	0.40%	3	1.30%	7	1.00%
Asian	2	0.80%	1	0.40%	1	0.40%	4	0.50%
Black or African American	14	5.60%	13	5.10%	4	1.80%	31	4.20%
Hispanic	7	2.80%	8	3.10%	7	3.10%	22	3.00%

Table 2
Descriptive Statistics

Variable	2020		2021		2022		Cumulative	
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct	Freq.	Pct.
Nonresident Alien	3	1.20%	6	2.40%	3	1.30%	12	1.60%
Race and Ethnicity Unknown	0	0.00%	1	0.40%	0	0.00%	1	0.10%
Two or More Races	5	2.00%	2	0.80%	9	3.90%	16	2.20%
Citizenship								
United States Citizen	244	98.40%	247	97.20%	224	98.20%	715	97.90%
Not United States Citizen	4	1.60%	7	2.80%	4	1.80%	15	2.10%
First Generation Student Status								
First Generation Student	56	22.60%	54	21.30%	55	24.10%	165	22.60%
Not First Generation Student	192	77.40%	200	78.70%	173	75.90%	565	77.40%
Pell Grant								
Pell Grant Eligible	76	30.60%	77	30.30%	66	28.90%	219	30.00%
Not Pell Grant Eligible	172	69.40%	177	69.70%	162	71.10%	511	70.00%
Admission Group								
Freshman Admission	144	58.10%	160	63.00%	140	61.40%	444	60.80%

Table 2
Descriptive Statistics

Variable	2020		2021		2022		Cumulative	
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct	Freq.	Pct.
Transfer Admission	104	41.90%	94	37.00%	88	38.60%	286	39.20%
Major: Pre-Veterinary Medicine Track								
Animal Sciences (Pre-Vet)	60	24.20%	57	22.40%	62	27.20%	179	24.50%
Poultry Science (Pre-Vet)	5	2.00%	2	0.80%	5	2.20%	12	1.60%
Major: Not Pre-Veterinary Medicine Track								
Agricultural Communications	13	5.20%	5	2.00%	15	6.60%	33	4.50%
Agricultural Business & Economics	47	19.00%	43	16.90%	37	16.20%	127	17.40%
Agricultural Science	12	4.80%	20	7.90%	26	11.40%	58	7.90%
Animal Sciences (Allied Industries)	14	5.60%	26	10.20%	16	7.00%	56	7.60%
Animal Sciences (Equine)	3	1.20%	11	4.30%	3	1.30%	17	2.30%
Animal Sciences (Meat Science)	2	0.80%	3	1.20%	1	0.40%	6	0.80%
Applied Biotechnology	0	0.00%	4	1.60%	1	0.40%	5	0.70%
Biological and Agricultural Technology	0	0.00%	0	0.00%	3	1.30%	3	0.40%

Table 2
Descriptive Statistics

Variable	2020		2021		2022		Cumulative	
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct	Freq.	Pct.
Crop, Soil and Environmental Science (Production)	11	4.40%	13	5.10%	4	1.80%	28	3.80%
Crop, Soil and Environmental Science (Science)	2	0.80%	3	1.20%	1	0.40%	6	0.80%
Crop, Soil and Environmental Science (Soil, Water, and Land Use)	1	0.40%	0	0.00%	0	0.00%	1	0.10%
Crop, Soil and Environmental Science (Turfgrass)	13	5.20%	7	2.80%	4	1.80%	24	3.30%
Environmental Science	15	6.00%	12	4.70%	13	5.70%	40	5.50%
Fisheries, Aquaculture, & Aquatic Sciences (Fisheries)	7	2.80%	9	3.60%	6	2.60%	22	3.00%
Fisheries, Aquaculture, & Aquatic Sciences (Marine Resources Management)	0	0.00%	2	0.80%	1	0.40%	3	0.40%
Food Science	2	0.80%	5	2.00%	2	0.90%	9	1.20%
Horticulture	28	11.30%	28	11.00%	15	6.60%	71	9.70%
Poultry Science (Production)	13	5.20%	4	1.60%	13	5.70%	30	4.10%

Table 2
Descriptive Statistics

	2020		2021		2022		Cumulative	
Variable	Freq.	Pct.	Freq.	Pct.	Freq.	Pct	Freq.	Pct.

n = 730

Table 3
Additional Academic Descriptive Statistics

Variable	Mean	Std. dev.	Min	Max
Cumulative GPA				
GPA_cum	3.04611	0.5184819	2	4
Cohort Year				
cohort2020	0.339726	0.4739409	0	1
cohort2021	0.3479452	0.4766451	0	1
cohort2022	0.3123288	0.4637609	0	1
HIP Participation				
eportfolio	0.1150685	0.3193234	0	1
internship	0.4068493	0.4915831	0	1
ugresearch	0.2315068	0.4220847	0	1
studyabroad	0.0821918	0.274845	0	1
coop	0.0219178	0.1465156	0	1
hipnone	0.3917808	0.4884828	0	1

n = 730

Results

Model 1: Pre-Vet Majors Continuing Education Six Months Post-Graduation

The results of the first logit model in the study show findings on the relevance of factors on a pre-veterinary medicine student's likelihood of continuing education through graduate or professional school over any other career outcome six months after graduation. To make comparisons, all variables were coded into binary (0, 1) format. Model 1 analyzed the 191 observations whose major was pre-veterinary medicine (Animal Sciences (Pre-Vet) or Poultry Science (Pre-Vet). Model 1 took the following form:

$$Y = a_0 + a_1X_1 + a_2X_2 + a_3X_3$$

Where: **Y** represents the dependent variable *education*; X_1 represents participation in high impact practices: *internship*, *ugresearch*, *studyabroad*, *eportfolio*, *coop*, and *hipnone*; X_2 represents student demographic characteristics: *firstgen*, *white*, *gender*, *GPA_cum*, *transfer*, and *pell*; X_3 represents *Cohort_Year*.

The results show that all high impact practices and demographic characteristics do not have a statistically significant impact on pre-vet students attending graduate or professional school. Cohort year also did not have a statistically significant impact on a student continuing their education. Cumulative GPA was the only statistically significant factor on a pre-vet student's likelihood of continuing education($\beta = 1.895$, $p < 0.001$). Students with a higher cumulative GPA were 46.8% more likely to be attending graduate or professional school within the first six months of graduation, holding other covariates constant at mean.

Table 4
Continuing Education: 6 Months Post-Graduation
Pre-Veterinary Medicine Track Majors
Estimation Sample Logit Model 1 Results

Variable	Coefficient	Robust std. err.	Marginal Effects	P>|z|

High Impact Practices

Table 4
Continuing Education: 6 Months Post-Graduation
Pre-Veterinary Medicine Track Majors
Estimation Sample Logit Model 1 Results

Variable	Coefficient	Robust std. err.	Marginal Effects	P>|z|
internship	0.1742373	0.5754353	0.043005	0.762
ugresearch	0.0856765	0.6020934	0.021147	0.887
studyabroad	-0.2381082	0.6538277	-0.058770	0.716
eportfolio	0.9069229	0.8309972	0.223847	0.275
coop	-0.5404842	1.930576	-0.133402	0.780
hipnone	-0.4088857	0.6800718	-0.100921	0.548
Demographic Information				
firstgen	-0.2986625	0.4095172	-0.073716	0.466
white	0.0800971	0.4725044	0.019770	0.865
gender	-0.0172644	0.4857374	-0.004261	0.972
GPA_cum	1.89539***	0.38307	0.467820	0.000
transfer	-0.2278012	0.4046365	-0.056226	0.573
pell	-0.3566077	0.4115559	-0.088018	0.386
Cohort Year				
2021	-0.2371264	0.4320038	-0.056927	0.583
2022	-0.6203457	0.4107796	-0.152254	0.131
Intercept	-5.362913	1.37498		0.000

$n = 191$
* p<0.1, ** p<0.05, *** p<0.001

Table 5
Summary Statistics
Estimation Sample Logit Model 1

Variable	Mean	Std. dev.	Min	Max
education	0.5497382	0.4988275	0	1

High Impact Practices

Table 5

Summary Statistics

Estimation Sample Logit Model 1

Variable	Mean	Std. dev.	Min	Max
eportfolio	0.1780105	0.3835269	0	1
internship	0.3507853	0.4784701	0	1
ugresearch	0.1256545	0.3323306	0	1
studyabroad	0.0680628	0.2525156	0	1
coop	0.0104712	0.1020593	0	1
hipnone	0.460733	0.4997657	0	1
Demographic				
firstgen	0.2722513	0.4462884	0	1
white	0.8324607	0.3744381	0	1
gender	0.1518325	0.3598015	0	1
GPA_cum	3.243455	0.5200826	2.01	4
transfer	0.2356021	0.4254898	0	1
pell	0.2670157	0.4435633	0	1
Cohort Year				
2021	0.3089005	0.4632543	0	1
2022	0.3507853	0.4784701	0	1

n = 191

Model 2: All Other Majors Continuing Education Six Months Post-Graduation

Model 2 analyzed the effects of high impact practices and other demographic characteristics on the likelihood of attending graduate or professional school for all other majors. The *prevet* variable was dropped from the sample, and the resulting sample consisted of 539 observations. To make comparisons, all variables were coded into binary (0, 1) format. The standard error adjusted for 22 clusters in major. Model 2 took the following form:

$$Y = a_0 + a_1X_1 + a_2X_2 + a_3X_3$$

Where: **Y** represents the dependent variable *education*; **X₁** represents participation in high impact practices: *internship*, *ugresearch*, *studyabroad*, *eportfolio*, *coop*, and *hipnone*; **X₂** represents student demographic characteristics: *firstgen*, *white*, *gender*, *GPA_cum*, *transfer*, and *pell*; **X₃** represents *Cohort_Year*.

The results of Model 2 indicate statistical significance for some of the high impact practices and cumulative GPA. Participating in an internship did not have a statistically significant outcome on attending graduate school. Undergraduate research had a positive statistical significance on the likelihood of non-pre-vet track majors continuing education after obtaining an undergraduate degree ($\beta = 1.33$, $p < 0.001$). Students with undergraduate research experience were 13.2% more likely to attend graduate or professional school, holding other covariates constant at mean. Additionally, study abroad had a positive statistical significance ($\beta = 0.720$, $p < 0.1$). This means that students who studied abroad were 7.1% more likely to continue their education, holding other covariates constant at mean. E-Portfolio had a negative statistical significance for non-pre-vet majors attending graduate school ($\beta = -1.375$, $p < 0.05$). Students completing an e-Portfolio were 13.6% less likely to attend graduate or professional school, holding other covariates constant at mean.

None of the demographic variables had statistical significance in Model 2. In addition, cohort year was not statistically significant in a student's likelihood of continuing education. Cumulative GPA, again, had a positive statistical significance on non-pre-vet major students continuing their education after obtaining an undergraduate degree within the first 6 months after graduation ($\beta = 1.548$, $p < 0.001$). Students with a high GPA were 15. 3% more likely to attend graduate or professional school, holding other covariates constant at mean.

Table 6
Continuing Education: 6 Months Post-Graduation
All Non-Pre-Vet Majors
Estimation Sample Logit Model 2 Results

Variable	Coefficient	Robust std. err.	Marginal Effects	P>|z|
High Impact Practices				
internship	-0.2796996	0.3231415	-0.0276324	0.387
ugresearch	1.338795***	0.3156593	0.1322638	0.000
studyabroad	0.7198235*	0.4172165	0.0711137	0.084
eportfolio	-1.374639**	0.692748	-0.1358050	0.047
coop	0.6178397	0.7734583	0.0610384	0.424
hipnone	-0.5322796	0.4714777	-0.0525856	0.259
Demographic Information				
firstgen	-0.4092725	0.2749872	-0.0404334	0.137
white	-0.2894639	0.3481906	-0.0285971	0.406
gender	-0.3848807	0.3081667	-0.0380236	0.212
GPA_cum	1.547664***	0.2937961	0.1528987	0.000
transfer	0.0356445	0.2738228	0.0035214	0.896
pell	-0.289756	0.1872585	-0.0286259	0.122
Cohort Year				
2021	-0.2740603	0.3060646	-0.0296840	0.371
2022	-0.5242625	0.4594958	-0.0517774	0.254
Intercept	-5.586641	1.065606		0.000

n = 539

Std. err. adjusted for 22 clusters in major

* p<0.1, ** p<0.05, *** p<0.001

Table 7

Summary Statistics

Estimation Sample Logit Model 2

Variable	Mean	Std. dev.	Min	Max
education	0.1651206	0.3716343	0	1
High Impact Practices				
eportfolio	0.4879406	0.5003189	0	1
internship	0.1892393	0.3920625	0	1
ugresearch	0.0667904	0.2498905	0	1
studyabroad	0.1317254	0.3385062	0	1
coop	0.025974	0.1592055	0	1
hipnone	0.3673469	0.4825299	0	1
Demographic				
firstgen	0.2096475	0.4074352	0	1
white	0.8868275	0.3170979	0	1
gender	0.5974026	0.4908765	0	1
GPA_cum	2.976178	0.5000103	2	4
transfer	0.4359926	0.4963468	0	1
pell	0.3116883	0.4636135	0	1
Cohort Year				
2021	0.3617811	0.4809623	0	1
2022	0.2987013	0.4581137	0	1

$n = 539$

Std. dev. not adjusted for clustering

Number of clusters = 22

Model 3: Pre-Vet Majors Gaining Full Time Employment Six Months Post-Graduation

After running the estimation sample logit Models 1 and 2 to determine the impact of high impact experiences attending graduate or professional school, 224 observations were dropped from the sample pool because those students went continue their education or some other track than attempting to be gainfully employed. Thirty of these observations included students whose

final plan 6 months after graduation were "Military," "No Data Collected," "Not Seeking,"
"Offered," "Other," or "Volunteer." In addition, 194 students who indicated they were attending
graduate or professional school and were dropped from the sample. The observations that are
used in this model include "Part Time," "Still Applying," "Still Looking," and "Full Time."
Again, to determine the effects of high impact practices on becoming gainfully employed, we ran
Model 3 only on pre-veterinary medicine track students. This model analyzed 79 observations
from pre-vet students who did not attend graduate school and were attempting to become
employed full time. Model 3 took the following form:

$$Y = a_0 + a_1X_1 + a_2X_2 + a_3X_3$$

Where: **Y** represents the dependent variable *finalplan_fulltime*; X_1 represents
participation in high impact practices: *internship*, *ugresearch*, *studyabroad*, *eportfolio*, *coop*, and
hipnone; X_2 represents student demographic characteristics: *firstgen*, *white*, *gender*, *GPA_cum*,
transfer, and *pell*; X_3 represents *Cohort_Year*.

To address the question of influence of high impact practices on having obtained a full-
time position six months after graduation, we analyzed observations of pre-vet students who
have full time positions, part time positions, those who are still applying, and those who are still
looking for jobs. None of the high impact practices had a statistical significance in the likelihood
that a pre-vet track major becoming employed full-time within six months of graduation.

Gender was the only demographic characteristic that had statistical significance (β = -
2.304, $p < 0.05$). Men pursuing pre-vet track majors were more 39% more likely to pursue full
time employment than females holding other covariates constant at mean. However, the gender
makeup of the sample can likely explain this. There were only 3 observations for male pre-vet
track majors who went on to have full time employment. Approximately 59% of the male pre-vet

students went on to attend graduate school. Further information on the first destination of pre-vet students can be found in Appendix C. Cumulative GPA is positively statistically significant for the likelihood that pre-vet students that did not attend graduate school within the first six months post-graduation and are attempting to become employed. Students with a high cumulative GPA were 23.8% more likely to become employed full time within six months post-graduation, holding other covariates constant at mean. Lastly, cohort year 2022 was positively statistically significant with becoming employed ($\beta = 2.182$, $p = 0.005$). Students in cohort year 2022 were 38.3% more likely to become employed within the first six months post-graduation.

Table 8
Full Time Employment: 6 Months Post-Graduation
Pre-Veterinary Medicine Track Majors
Estimation Sample Logit Model 3 Results

Variable	Coefficient	Robust std. err.	Marginal Effects	P>|z|
High Impact Practices				
internship	21.29809	2333.811	3.602491	0.993
ugresearch	18.94829	2333.811	3.205031	0.994
studyabroad	20.1804	2333.812	3.413439	0.993
hipnone	20.17445	2333.811	3.412432	0.993
Demographic Information				
firstgen	0.9281774	0.7570148	0.156998	0.220
white	-0.9676868	0.7917777	-0.163681	0.222
gender	-2.303675**	1.09715	-0.389658	0.036
GPA_cum	1.406588**	0.6663869	0.237919	0.035
transfer	-0.341556	0.6439544	-0.057773	0.596
pell	-0.5881037	0.6615301	-0.099476	0.374

Table 8
Full Time Employment: 6 Months Post-Graduation
Pre-Veterinary Medicine Track Majors
Estimation Sample Logit Model 3 Results

Variable	Coefficient	Robust std. err.	Marginal Effects	P>|z|
Cohort Year				
2021	1.222923	0.7773876	0.265154	0.116
2022	2.182023**	0.7835415	0.383325	0.005
Intercept	-24.79811	2333.813		0.992

n = 79
* p<0.1, ** p<0.05, *** p<0.001

Table 9
Summary Statistics
Estimation Sample Logit Model 3

Variable	Mean	Std. dev.	Min	Max
finalplan_fulltime	0.4556962	0.5012157	0	1
High Impact Practices				
eportfolio	0.1265823	0.3346291	0	1
internship	0.278481	0.4511157	0	1
ugresearch	0.1012658	0.3036081	0	1
hipnone	0.5822785	0.4963352	0	1
Demographic				
firstgen	0.3037975	0.4628349	0	1
white	0.7721519	0.4221243	0	1
gender	0.1518987	0.3612162	0	1
GPA_cum	3.012405	0.5204589	2.01	3.95
transfer	0.2911392	0.4571904	0	1
pell	0.3291139	0.472894	0	1

Cohort Year

Table 9
Summary Statistics
Estimation Sample Logit Model 3

Variable	Mean	Std. dev.	Min	Max
2021	0.278481	0.4511157	0	1
2022	0.3924051	0.4914062	0	1

n = 79

Model 4: All Other Majors Gaining Employment Six Months Post-Graduation

Model 4 analyzes the impact of HIPs and other demographic characteristics of observations who were not on a pre-veterinary medicine track and are attempting to become gainfully employed. The observations that are used in this model include the following final plan options: "Part Time," "Still Applying," "Still Looking," and "Full Time." The sample was 423 observations, and the standard error was adjusted for 21 clusters in major. Model 4 took the following form:

$$Y = a_0 + a_1X_1 + a_2X_2 + a_3X_3$$

Where: **Y** represents the dependent variable *finalplan_fulltime*; X_1 represents participation in high impact practices: *internship*, *ugresearch*, *studyabroad*, *eportfolio*, *coop*, and *hipnone*; X_2 represents student demographic characteristics: *firstgen*, *white*, *gender*, *GPA_cum*, *transfer*, and *pell*; X_3 represents *Cohort_Year*.

For the influence of high impact practices, internship participation had a statistically significant positive impact on full time employment ($\beta = 0.822$, $p < 0.1$). Holding all other covariates constant at mean, students who participated in an internship were 12.3% more likely to have secured full-time employment within six months post-graduation. Undergraduate research did not have a significant impact on the likelihood of have a full-time job six months after graduation.

Students who studied abroad were less likely to have secured full-time employment within 6 months after graduation (β = -0.746, $p < 0.001$). Students who studied abroad were 11.2% less likely to become gainfully employed. Based on additional investigation, 46.7% of students that studied abroad continued their education in graduate school. 31.7% of students who studied abroad secured full time positions within 6 months after graduation. Students that studied abroad tended to attend graduate school instead of obtaining full time employment (see Appendix B). Cumulative GPA did not have a statistically significant impact on a student's likelihood of having a full-time job six months after graduation.

Male students were more likely than female students to obtain full time employment within six months of graduation (β = 0.625, $p < 0.05$). Holding all other covariates constant at mean, male students were 9.4% more likely to secure full time employment. This result supports findings from the previous models suggesting that female students are more likely to attend graduate school. Being a first-generation student had no statistically significant impact on the likelihood of securing full time employment within 6 months after graduation. White students were more likely to have full time employment 6 months post-graduation (β = 0.673, $p < 0.05$) than all other races. White students were 10% more likely to have secured full-time employment within 6 months post-graduation. Transfer admission had no impact on full time employment. Pell grant eligibility also had no statistically significant impact on full time employment six months post-graduation. Model 4 confirms that—holding all other variables constant—cohort years 2020 and 2021 are not statistically different from one another in the likelihood of graduates to find full time employment within six months of graduation. However, cohort year 2022 has a positive statistically significant outcome likely meaning the impacts of the Covid-19 pandemic were impacting graduates less by 2022 (β = 0.680, $p < 0.005$).

Table 10
Full Time Employment: 6 Months Post-Graduation
All Non-Pre-Vet Majors
Estimation Sample Logit Model 4 Results

Variable	Coefficient	Robust std. err.	Marginal Effects	P>|z|
High Impact Practices				
internship	0.8223557*	0.4272687	0.1231946	0.054
ugresearch	-0.6003685	0.382988	-0.0899394	0.117
studyabroad	-0.7463891***	0.1989116	-0.1118142	0.000
eportfolio	-0.3279826	0.3427634	-0.0491341	0.339
coop	0.2081929	0.8821812	0.0311887	0.813
hipnone	-0.0862665	0.5590544	-0.0129233	0.877
Demographic Information				
firstgen	0.0734108	0.3340603	0.0109974	0.826
white	0.6728044**	0.3009374	0.1007908	0.025
gender	0.6251835**	0.3031906	0.0936568	0.039
GPA_cum	0.13429	0.359993	0.0201176	0.709
transfer	0.1361089	0.2339242	0.0203901	0.561
pell	0.1092802	0.2593103	0.0163709	0.673
Cohort Year				
2021	0.0235916	0.1616835	0.0040029	0.884
2022	0.680181**	0.2244526	0.0944809	0.002
Intercept	-0.4368208	1.403035		0.756

n = 423

Std. err. adjusted for 21 clusters in major

* p<0.1, ** p<0.05, *** p<0.001

Table 11
Summary Statistics
Estimation Sample Logit Model 4

Variable	Mean	Std. dev.	Min	Max
finalplan_fulltime	0.7943262	0.4046717	0	1
High Impact Practices				
eportfolio	0.5035461	0.5005795	0	1
internship	0.1371158	0.3443769	0	1
ugresearch	0.0520095	0.222309	0	1
studyabroad	0.144208	0.3517165	0	1
coop	0.0212766	0.1444758	0	1
hipnone	0.3877069	0.487804	0	1
Demographic				
firstgen	0.21513	0.4113991	0	1
white	0.891253	0.3116902	0	1
gender	0.6288416	0.4836868	0	1
GPA_cum	2.900922	0.4808132	2	4
transfer	0.4468085	0.4977513	0	1
pell	0.321513	0.4676102	0	1
Cohort Year				
2021	0.3593381	0.4803746	0	1
2022	0.3096927	0.4629144	0	1

n = 423
Std. dev. not adjusted for clustering
Number of clusters = 21

Discussion

When analyzing the results of all models we want to look at them individually and collectively to find the best policy recommendations for how to go about allocating resources to high impact practices in the future. We are unable to measure a student's goals and plan upon entering college, and the study has no way of accounting for this unobservable variable.

However, the College of Agriculture at Auburn University's graduating cohorts 2020, 2021, and 2022 contain 26.1% students following a pre-veterinarian track in Animal Sciences (Pre-Vet) and Poultry Science (Pre-Vet) majors. While we are unable to officially measure student's original academic and career goals, we can assume that students in these majors likely had the intention of continuing education after obtaining an undergraduate degree. Due to the demographic makeup, HIP participation, and overall sample size, students in a pre-veterinary medicine track major were analyzed separately from all other majors.

The results aim to show the influence of participating in high impact experiences on the likelihood of continuing education or full-time employment within six months of graduating. Students' intrinsic goals and beliefs on what they their next step will be would fall into the category of unobservable responses and data that we do not have for this study.

The findings of the models indicate a limited impact on early career outcomes from demographic characteristics. From the four models, the only demographic variables that had any kind of statistically significant impact were race and gender. Consistently across all cohort years we see a statistically significant impact more consistently from high impact practices such as internships, study abroad, and undergraduate research. Our study found that participation in high impact practices had a statistically significant impact on first destination placement. These findings support our theory that in the College of Agriculture at Auburn University, the academic and student experience has the most impact on job placement over demographics, admission type, academic major, and even grade point average.

E-Portfolios have a negative statistical significance for the likelihood of non-pre-vet major students in attending graduate school. However, the frequency of students who participated in these experiences are small relative to the overall sample. In addition, we don't

see statistically significant impacts from co-op. To analyze the differentiation of statistical significance between high impact practices, we consider the frequency of students who participated in more than one of the high impact practices. Approximately 22.4% of College of Agriculture at Auburn University students participated in more than one high impact experience across cohort years 2020, 2021, and 2022. Students who only participated in co-op only make up 0.6% of the sample pool, and those who only completed an e-Portfolio make up 1.5% of the total sample. However, students who participated in co-op in addition to other high impact practices make up 1.6% of the sample. Students who participated in an e-portfolio in addition to at least one other high impact practice make up 10% of the sample (Appendix A). So, in conjunction with other high impact practices these students likely also yielded positive results that were not shown as statistically significant.

Next, we analyze the models collectively. Independently, the high impact practices have some negative statistical significance. For Model 1, the only variable with statistical significance was cumulative GPA for pre-vet students continuing education. Intuitively, these results are explained by the rigor of the pre-veterinary medicine track majors and the competitive nature of veterinary medicine graduate program admissions. However, when we analyze Model 2, we see that undergraduate research and study abroad have a positive statistical significance on students in all other majors attending graduate or professional school. These results suggest that studying abroad could influence a students' choice on continuing education. E-Portfolio had a negative statistical significance for all other majors in going to graduate school, but this could be explained by unobservable characteristics of faculty members encouraging e-Portfolios.

Study abroad had a negative impact on the probability of securing a full-time job within six months of graduating. However, studying abroad had a positive impact on the probability of

students choosing to continue their education by enrolling in graduate or professional school. By analyzing the results from Models 2 and 4, we can conclude that participating in an internship tends to move students toward full time employment, and undergraduate research tends to move students toward continuing education.

Limitations and Conclusion

This study uses only First Destination Survey results from one academic college at one institution. Therefore, there are limits due to the single institution's dimensionality. The findings of this study are not feasible for generalizations to higher education but could serve to set a foundation and research methodology for studies at other institutions. Additionally, employing a multinomial logit model in future research regarding First Destination Survey Data could be a better fit for the structure of the data.

The College of Agriculture at Auburn University also has intrinsic unique characteristics that have influence on the employability of its graduates that cannot be measured. However, this is the case for every institution, but there is a degree of congruence across higher education that allow for this study to be applicable. The size and makeup of the sample are the largest limitation of the study. The sample data is made up from College of Agriculture at Auburn University graduates from 2020 to 2022. Future research is needed to see if findings from this study hold in future years and what impacts the COVID-19 pandemic had on graduates' early career outcomes. This sample only includes undergraduate students. The student makeup is majority white, non-Hispanic students. The gender composition of the sample pool is relatively evenly distributed.

Another limitation of this study is we were unable to measure students' initial career and education goals when entering college. This limitation leads to a research question that we are

unable to answer: at what point do students decide their next career steps? This factor could shift

their decisions on involvement during college. More information is also needed to determine the

structure of high impact practices across the agriculture discipline inside and outside the College

of Agriculture at Auburn University. The informational barrier to entry could be one reason for

lack of participation from some types of students. Finding a standardized way to fill this

knowledge gap and make it accessible to all would likely increase participation in less common

high impact practices such as co-ops, service learning, and e-portfolios.

Overall, the results from both models of our study show a positive statistically significant

impact of several of the high impact practices. We can conclude that participating in high impact

practices lead to a positive early career outcome of full-time employment or continuing

education. As a higher education institution, we urge the Auburn University College of

Agriculture to continue encouraging participation in high impact experiences. More data is

needed to analyze the students participating high impact practices including what year they

participated in the HIP and how they sought out participation. This data would move this study

forward to identify gaps in outreach for students. Additionally, we would be able to pinpoint the

optimal timing for students participating in HIPs to maximize their personal and professional

gains.

References

"College of Agriculture at Auburn University Academic Majors & Minors."

https://agriculture.auburn.edu/students/academics/.

"College of Agriculture at Auburn University Office of Global Programs."

https://agriculture.auburn.edu/outreach/global-programs/.

"Federal Pell Grants." accessed 7/12/2024. https://studentaid.gov/understand-

aid/types/grants/pell.

"Feeding The Economy." accessed 5/29/2024. https://feedingtheeconomy.com/.

2022. Required Course in Final Semester Yields High FDS Knowledge Rates for Auburn.

Andelt, Larry L, Leverne A Barrett, and Brian K Bosshamer. 1997. "Employer assessment of the

skill preparation of students from the College of Agricultural Sciences and Natural

Resources University of Nebraska-Lincoln: Implications for teaching and curriculum."

Nacta Journal 41 (4):47-53.

Bandura, Albert. 1997. *Self-efficacy: The exercise of control*: Macmillan.

Bruwer, Johan. 1999. "First destination graduate employment as key performance indicator:

Outcomes assessment perspectives." *Journal of Institutional Research in Australasia* 8

(2):61-91.

Fernandez, J. Marcos, Allan D. Goecker, Ella Smith, Emma R. Moran, and Christine A.

Wilson. "Employment Opportunities for College Graduates in Food, Agriculture,

Renewable Natural Resources and the Environment."

https://www.purdue.edu/usda/employment/.

Hegerfeld-Baker, J, S Anand, L Droke, and K Chang. 2015. "Factors influencing choosing food

and agriculture related STEM majors." *NACTA Journal* 59 (1):34-40.

Klein, Marvin L. 1990. "Southern California Food And Agricultural Firms." *NACTA Journal* 34 (2):30-34.

Kuh, George. 2008. "High Impact Educational Practices: What They Are, Who Has Access To Them, and Why They Matter." *Association of American Colleges & Universities*.

Kuh, George, Ken O'Donnell, and Carol Geary Schneider. 2017. "HIPs at Ten." *Change: The Magazine of Higher Learning* 49 (5):8-16. doi: 10.1080/00091383.2017.1366805.

Lent, Robert W, Steven D Brown, and Gail Hackett. 2002. "Social cognitive career theory." *Career choice and development* 4 (1):255-311.

Miller, Angie L., Louis M. Rocconi, and Amber D. Dumford. 2018. "Focus on the finish line: does high-impact practice participation influence career plans and early job attainment?" *Higher Education* 75 (3):489-506. doi: 10.1007/s10734-017-0151-z.

Nevison, Colleen, David Drewery, Judene Pretti, and Lauren Cormier. 2017. "Using Learning Environments to Create Meaningful Work for Co-Op Students." *Higher Education Research and Development* 36 (4):807-822. doi: 10.1080/07294360.2016.1229268.

Parrella, Jean A, Christina Esquivel, Holli R Leggette, and Theresa Pesl Murphrey. 2024. "Preparing agricultural leaders: an assessment of agricultural students' perceived importance and development of employability skills." *The Journal of Agricultural Education and Extension* 30 (2):233-255.

Robinson, J Shane. 2006. "Graduates' and employers' perceptions of entry-level employability skills needed by agriculture, food and natural resources graduates." University of Missouri--Columbia.

Robinson, J Shane, Bryan L Garton, and Paul R Vaughn. 2007. "Becoming employable: A look at graduates' and supervisors' perceptions of the skills needed for employability." *NACTA Journal*:19-26.

Robst, John. 2007. "Education and job match: The relatedness of college major and work." *Economics of Education Review* 26 (4):397-407. doi: 10.1016/j.econedurev.2006.08.003.

Twang, Alison Handy. 2022. "High-Impact Learning Experiences and Post-Graduate Outcomes: Exploring the Influence on Employment, Continuing Education and Salary." *The SUNY Journal of the Scholarship of Engagement: JoSE* 2 (1):2.

Vetter, Austin, and Gary Wingenbach. 2019. "Self-perceived employability skills from agricultural study abroad experiences." *NACTA Journal* 63 (1a):164-172.

Watson, C Edward, George D Kuh, Terrel Rhodes, Tracy Penny Light, and Helen L Chen. 2016. "ePortfolios–The eleventh high impact practice." *International Journal of ePortfolio* 6 (2):65-69.

Wolniak, Gregory C, and Mark E Engberg. 2019. "Do" High-Impact" College Experiences Affect Early Career Outcomes?" *The Review of Higher Education* 42 (3):825-858. doi: https://doi.org/10.1353/rhe.2019.0021.

Appendices

Appendix A: Student HIP Participation

HIP Participation	Freq.	Percentage
Students participating in at least one HIP	444	60.9%
Students not participating in HIPs	286	39.2%
Students participating in more than one HIP	152	20.9%
including co-op	12	1.6%
including e-Portfolio	73	10.1%
including study abroad	36	4.9%

$n = 730$

Appendix B: Final Plan of Students Who Studied Abroad

Students Who Studied Abroad

Final Plan	Freq.	Percentage
Education	28	46.67%
Full Time	19	31.67%
No Data Collected	1	1.67%
Other	1	1.67%
Part Time	1	1.67%
Still Applying	4	6.67%
Still Looking	6	10.00%

$n = 60$

Appendix C: Final Plan of Pre-Vet Students by Gender

Pre-Vet Track Majors
Male

Final Plan	Freq.	Percentage
Education	17	58.62%
Full Time	3	10.34%
Still Applying	4	13.79%
Still Looking	5	17.24%

n = 29

Pre-Vet Track Majors
Female

Final Plan	Freq.	Percentage
Education	88	58.62%
Full Time	34	20.99%
Other	3	1.85%
Part Time	7	4.32%
Still Applying	20	12.35%
Still Looking	10	6.17%

n = 162