With Progressively Virtual Classrooms, How Important Are On-farm Technical Education Opportunities? Students Answer!

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Abstract

The purpose of this study is to determine student's perceived value of on-farm, technical training at a university farm. Specifically, this study evaluates students use and non-use of the university farm and the student's perception of this use on overall academic competency and career readiness. The target population of the study included all students enrolled within a College of Agriculture. The study uses both an online survey instrument requesting demographic information and uses and value of the farm as well as three focus groups. Results indicate that the primary reasons students do not utilize the farm more include lack of coursework using the farm and lack of available activities utilizing the farm as well as communication. However, students did report that the time and activities they have completed at the farm have been practical, desirable for future employers, and made a value contribution to their education.

Keywords: experiential learning, technical education, on-farm learning

Across the United States, there are over 300 college farms outside of the land grant university system alone (LeCharite, 2016). As with many of these farms, they must create value and student opportunity within the bounds of tightening operational budgets, making the need to explicitly justify the value of the college farm even more important (Holthouser & Terry, 2012). The purpose of this assessment investigation is to answer the question: Does on-farm/technical experience impact student success and the quality of education? The overarching goal of this manuscript is to determine the value of hands-on farm activities. The use of an online survey instrument as well as focus groups are used to examine students' perceptions of the value of on-farm learning to their overall education as well as employability. For the purpose of this manuscript, value is used as a delegation for all things related to student success and job preparation.

The Arkansas State University Agricultural Teaching and Research Center (ATRC) and Equine Center provide valuable technical education opportunities for student. Both centers are located less than a mile from main campus. The ATRC is 240 acres and maintains 50 head of beef cows, 50 ewes, 22 sows, and 9 does. The livestock are used for teaching and research and are marketed to generate farm income. The ATRC is also home to the Bill and Alice Nix petting zoo, which is open to the public for two days each fall and spring. Hay is produced for both feeding our livestock and to market. Approximately 17 acres are dedicated to small plot research, primarily soy beans, cover crops, and corn.

David Kolb (1984) proposed that experiential learning is a cycle that encompasses differential learning styles. Kolb's experiential learning cycle contains four modes:

- Concrete experience - doing or having an experience
- Reflective observation – a reflection of the experience
- Abstract conceptualization - learning from the experience, and
- Active experimentation - trying out what was learned.

Each stage of the cycle of experiential learning is mutually supportive and a student can enter the cycle at any stage. Other reports have summarized that experiential learning improved student perceptions of learning and fostered increased utilization of critical thinking skills and improved retention of information (Kyle, Bonnstetter, & Gadsen, 1988; Halpern, 2003). Further, experiential learning is a tool that supplements traditional learning, deepens the learning experience, is active and practical, reflects student career interests, and supports the development of skills

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desired by future employers (Hodge, et al., 2011; Manolis, Burns, Assudani, & Chinta, 2013).

Methods

Survey Design

The survey design and experimental process were approved by the Arkansas State University Institutional Review Board. The survey consisted of 21 questions soliciting demographic information (sex, class standing, major), the extent to which the student has used the college farm (number of classes, labs, research attended at the farm), and the student's perception of the benefits of having access and utilizing the college farm. For applicable questions, a Likert-scale (1- strongly disagree, 2 – disagree, 3-neither agree nor disagree, 4 – agree, 5 – strongly agree) was used to evaluate student responses. Additionally, the survey contained open-ended questions to allow students to provide details and feedback for their choices. The survey was hosted on the Qualtrics website and was distributed through a listserv of all enrolled College of Agriculture students (this ensured that each student only completed the survey once). Participants of the survey were incentivized to complete the survey through a drawing in which 5 participants were randomly selected to receive a $50 gift card.

Focus Group Protocol

The experimental design also made use of focus groups to gain an in-depth understanding of students' perceptions and perceived value of the college farm. The use of focus groups allows students to clarify the researcher's questions and promote a dialogue not achievable in online surveys (Brandi, Rabadia, Chang, & Mandel, 2018). The focus groups were conducted in three rounds to allow for students of differing experiences to voice their thoughts and opinions. The three groups represent the three major areas of study in the college – agricultural economics, animal science, and plant and soil science. Each focus group ranged in total participants from 4 to 6 students. The focus group dialogue consisted of 6 questions, each question about why or why not students have utilized the college farm and ways in which they would like to see the farm utilized in the future.

Subject Selection

The entirety of the undergraduate student population for the 2021-2022 academic year was invited to participate in the survey (343 total students). A total of 130 complete responses were collected, for a response rate of 37.9%. Although students were asked to provide demographic information and their student identification number (to award gift cards), all personal identifying information was removed prior to analysis.

Results and Discussion

The Agricultural Teaching and Research Center (College farm) serves as a 240+ acre hub for agricultural training, research, and outreach in the Delta region. The purpose of the college farm is to discover, demonstrate, and disseminate knowledge of diverse agricultural systems to students, the agricultural community, and the general public. The purpose of this research focuses on the values and opportunities available to students at the college farm.

Survey Results

Demographic information is presented in Table 1. Females in the survey represent 60% of all survey respondents, which is in line with the 201 (58.6%) females enrolled for the 2021-2022 academic year. In terms of class standing, the majority of respondents (38.5%) were seniors, 24.6% juniors, 21.5% sophomores, and 15.4% freshmen. The distribution of majors in the survey is consistent with current enrollment with animal science (35.4%) and agricultural economics (42.3%) representing the majority of the responses as well as enrolled students.

Table 1.

Demographic Information from the College Farm Undergraduate Survey.[a]

Demographic Category		% of Total
Gender		
Male	52	40.0
Female	78	60.0
Class Standing		
Freshman	20	15.4
Sophomore	28	21.5
Junior	32	24.6
Senior	50	38.5
Major		
Animal Science	46	35.4
Agricultural Economics	55	42.3
Plant and Soil Science	23	17.7
Agricultural Studies	6	4.6

Note. [a]Total Respondents, n=130

In order to understand ways in which students value and use the college farm as well to prepare for future opportunities, we must first understand the current level of student use on the farm. The responses to farm use are presented in Table 2. Most students that responded to the survey (56.3%) have only taken one course at the college farm, with only 10.9% having taken 5 or more classes. The number of classes taken and a major in either animal science

Table 2.

Utilization of the College Farm[a]

How many classes have you taken that utilized the ATRC?	%
1	56.3
2	9.4
3	14.1
4	9.4
5 or more	10.9
How many hands-on activities have you completed at the ATRC?	24.6
0-5	32.6
6-10	25.6
11-15	18.6
16-20	4.7
20 or more	18.6

Note. [a]Total Respondents, n=130

(0.520) or plant and soil science (0.512) are significantly, and positively correlated. This would suggest that students in those majors have greater opportunities than students in other majors to utilize the farm. This is also consistent with open-ended survey questions in which students were asked why they did not utilize the farm. The number one response received was that they did not have a class that utilized it. A farm activity was defined as any hands-on activity taking place at the ATRC or Equine center, including for example, labs, work study, volunteering, and research. Additionally, 32.6% of respondents have completed a stand-alone activity at the farm, 25.6% completed 6-10 activities, 18.6% 11-15 activities, 4.7% 16-20 activities, and 18.6% 20 or more activities.

To determine students perceived value of the college farm, respondents were asked to respond to statements indicating their level of agreement (Table 3). Of the respondents, 95.2% either agree or strongly agree that on-farm learning deepened their understanding of agricultural concepts. Additionally, 92.7% of respondents either agree or strongly agree that on-farm learning has contributed to their confidence in agricultural concepts. A majority of respondents (92.7%) also either agree or strongly agree that their on-farm experiences have been active and practical. Providing meaningful, practical experiences is crucial to student success as non-traditional experiences help to facilitate a connection to concepts discussed in lecture (Steffs, 2004). The connection between on-farm learning and student career interest and preparedness was also examined. Of the respondents, 93% agree or strongly agree that learning on the farm has allowed them to develop their career interests more effectively. Students were also in agreeance that skills learned on the farm are desirable to their future employers with 95.1% either agreeing or strongly agreeing with the statement. This is an important factor to maintain in the future as employers place more value on hands-on, experiential training of their future employees (Oswald-Egg & Renold, 2021). Overall, 92.7% of respondents either agree or strongly agree that the college farm has made a valuable contribution to their education. Additionally, comparing major grouping and responses reveals similar positions across all majors, with the exception that agricultural business has more students choosing no opinion.

Students were also asked open response questions about ways in which the college farm could be more effectively utilized. The results are categorizable into two categories of suggestions: 1) offering more classes that utilize the college farm and 2) offering opportunities outside of classes or labs in which students can access and use the farm.

Focus Group Results

Demographic information about students involved in the focus groups is included in Table 4. Among the three focus groups, agricultural economics, animal science, and plant and soil science, there were a total of 15 participants. The purpose of splitting up the focus groups by major was to determine if there were consistent themes that arose as a result of major in the college. Across the three focus groups, males represented 60% of the student participants. The focus groups consisted of open and honest communication and sharing of opinions. The facilitators made sure students were aware that they could speak freely and that their additions to the conversation were confidential.

In conducting focus groups, it is very important to prepare and use specialized techniques to ensure adequate discussion and data collection (Nyumba et al., 2017). The Focus group protocol of this study followed this format to ensure consistency between groups and that students were informed about their participation. Students were re-introduced to the purpose of the focus groups, they were prompted to introduce themselves, and consent, confidentiality, and ground rules were established before proceeding with the recording of the focus group and progression through the 6 questions along with time for open discussion (Table 5). The length of the focus group sessions across the three groups was an average of 50 minutes. This project took a dual moderator approach, where one of the moderators would ask the questions and ensure the progression of the session, while the other moderator observed and took notes, sometimes adding to the discussion with various follow-up questions. The focus group recordings were analyzed and transcribed to evaluate and analyze the presence of specific themes that arose (Table 5).

Focus Group Question 1. What words would you use to describe the college farm? With one of the main aims of this research being to understand student perceptions of hands-on learning to their success, it was of interest that words like “essential”, “complex”, “fun”, “education”, and “research” were listed by students. A negative descriptor that was said during this portion of the focus group was “limited

Table 3.

Percentage of Undergraduate Student survey respondents indicating level agreement with statements relating to their value of the college farm[a]

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
On-farm learning at the ASU ATRC has deepened my understanding of agricultural concepts.	2.1	0.0	2.1	29.2	66.7
Agricultural Business	0.0	0.0	7.7	46.2	46.2
Agricultural Studies	0.0	0.0	0.0	100.0	0.0
Animal Science	5.0	0.0	0.0	25.0	70.0
Plant and Soil Science	0.0	0.0	0.0	14.3	85.7
My on-farm learning at the ASU ATRC has contributed to my confidence with agricultural concepts.	2.6	0.0	5.1	25.6	66.7
Agricultural Business	0.0	0.0	15.4	30.8	53.8
Agricultural Studies	0.0	0.0	0.0	0.0	100.0
Animal Science	5.6	0.0	0.0	16.7	77.8
Plant and Soil Science	0.0	0.0	0.0	42.9	57.1
My on-farm learning at the ASU ATRC has been hands-on.	2.6	0.0	5.1	25.6	66.7
Agricultural Business	0.0	0.0	7.7	46.2	46.2
Agricultural Studies	0.0	0.0	0.0	0.0	100.0
Animal Science	5.6	0.0	5.6	0.0	88.9
Plant and Soil Science	0.0	0.0	0.0	57.1	42.9
Learning on the farm at the ASU ATRC has allowed me to develop my career interests more effectively.	2.6	0.0	5.1	20.5	71.8
Agricultural Business	0.0	0.0	7.7	30.8	61.5
Agricultural Studies	0.0	0.0	0.0	0.0	100.0
Animal Science	5.6	0.0	5.6	5.6	83.3
Plant and Soil Science	0.0	0.0	0.0	42.9	57.1
I believe the skills I learned during on-farm activities at the ASU ATRC are desirable to my future employers.	2.4	0	2.4	24.4	70.7
Agricultural Business	0.0	0.0	7.1	35.7	57.1
Agricultural Studies	0.0	0.0	0.0	0.0	100.0
Animal Science	5.3	0.0	0.0	5.3	89.5
Plant and Soil Science	0.0	0.0	0.0	57.1	42.9
On farm learning at the ASU ATRC has made a valuable contribution to my education.	5.3	2.6	0.0	23.7	68.4
Agricultural Business	0.0	8.3	0.0	41.7	50.0
Agricultural Studies	0.0	0.0	0.0	0.0	100.0
Animal Science	5.9	0.0	0.0	0.0	94.1
Plant and Soil Science	12.5	0.0	0.0	50.0	37.5

Note. [a]Total Respondents, n=130

Table 4.

Breakdown of Participants by Focus Groups

	Agricultural Economics	Animal Science	Plant and Soil Science
Number of Participants	6	4	5
Males	4	0	5
Females	2	4	0
Freshman	2	2	0
Sophomores	0	0	2
Juniors	2	0	0
Seniors	2	2	3

Note. [a]Total Respondents, n=130

access". Interestingly, this concern would later develop in multiple of the groups as a consistent theme.

Focus Group Questions 2 and 3. What do you know about the college farm and where did you learn this information? Class was by far the most common answer by students in all of the focus groups for where they learned what they know about the farm. Students emphasized that their introductory courses seemed to utilize the farm most, and then upper elective/special topics courses that have lab sections. Students also mentioned tours, the farmers' market (when asked specifically about whether they had been a vendor or a customer they mentioned both), and one senior student from the three focus groups had also been involved in some on-farm research for an undergraduate research project.

Students in the animal science focus group were more easily able to list multiple pieces of information that they knew about the college farm. Interestingly, the students who were freshmen in the animal science group were able to discuss information more readily than one of the senior participants. Later, it came to light that the senior student had transferred from a different university and did not take the introductory courses offered by the college that very heavily use the farm for lab activities. Additionally, several students recognized the value and contribution of the college farm to the general public as they mentioned various outreach initiatives that the farm hosts like the hippotherapy program, the Bill and Alice Nix petting zoo, and the ASU regional farmers' market. Some specific quotes from students were: "Most of it is animal focused"; "I've never been to the farm, but I know where it is"; "I've only been out there once for a tour".

Focus Group Question 4. Why have or have you not used the college farm? When asked this question, a similar theme arose. Students emphasized that they either had not had any previous opportunity to go to the farm or that opportunities did not fit their schedule, some specific quotes included: "Not all classes have lab sections that utilize the farm". When asked to elaborate, students emphasized that some courses with labs did not always utilize the farm. One specific example given by a plant and soil science student was that a specific weed was pulled from the plot at the farm and brought to the lecture instead of having the students out to the farm.

Another very interesting and concerning theme arose in the animal science focus group, and later in open discussion among the other focus groups. The animal science student stated that the farm "seems cliquey". When asked follow up questions to explain, the students mentioned things like not having a farm background and being an out of state/region student. They mentioned that staff and student workers seemed to be a homogenous group of people who grew up with a farm background and that there was no opportunity for students of differing backgrounds to work at the farm, and that it took specific effort to "force your way in". This was especially concerning to learn; however, this is not a new issue. Several groups have studied the changing demographics of agricultural students. One study focused specifically on studying the area of animal science reported the shift in demographics is toward more women, and more diverse students from non-rural communities (Buchanan, 2008). Foreman and others (2018) highlighted that in their study of incoming College of Agriculture and Life Sciences freshmen at Iowa State University were from farms than any other demographic variable. Jean-Phillippe and coworkers (2019) specifically, sought to build cultural competency through an agricultural-based activity. Their article highlighted the fact that cultural competency, and the mutual understanding of individuals, is a process that evolves over an extended period (Betancourt et al., 2002; Randel et al., 2017). The student in the focus groups highlighted that the perception of the student workers at the farm was a narrow scope, one that went against this theory of cultural competency that fosters diverse experiences and perceptions.

Focus Group Question 5. What program ideas do you have for the college farm? Students were eager to give suggestions for how the ASU ATRC could be utilized to better benefit their education. The specific themes that arose in each focus group over and over again were activities that contribute to career readiness, and those that enable networking among peers and other individuals and professionals. Students in all of the focus groups listed several activities that contribute to career readiness including: Undergraduate research, summer internships at the farm, volunteer opportunities, more specialized/project-based courses, certification programs, and opportunities to participate in farm activities like planting and harvest activities. Internships and undergraduate research opportunities, specifically, were mentioned in every single focus group. This was especially beneficial to hear because it complements the university and college of agriculture's strategic plans. As for the theme of networking, students listed several opportunities where the farm could be utilized to that extent including: club activities, weekend seminars, dedicated space at the farm for study sessions, show/rodeo team, and more social events at the farm. When asked the follow-up question about how many hours students would participate in such activities answers ranged from 5 to 20 hours per week.

Table 5.

Focus Group Questions Summarized

Question	Descriptive Analysis of Data & Themes		
What word(s) would you use to describe the college farm (ASU ATRC)?	Agricultural Economics	Animal Science	Plant and Soil Science
	Education, fun, hands-on, training, messy	Research, labs, essential, cows	Farmers' market, complex, soybeans, by-products, limited access
What do you know about the college farm (ASU ATRC)?	Utilization – philanthropic, classes, research, outreach Concerns – Not much visibility, disorganized		
Where did you learn this information?	Introductory classes, class, tours, labs		
Why have or have you not used the college farm (ASU ATRC)?	Education – classes, classes with lab sections Volunteer – petting zoo, 4H and FFA events, farmers' market, hippotherapy program Social Events – Preview day, tours, clubs Concerns – visibility, advertising, communication, opportunities		
What program ideas do you have for the college farm (ASU ATRC)?	Volunteer, rodeo, research projects, internships, clubs, study sessions at the farm, certifications, project-based class, opportunity to be involved with planting and harvest		
What additional comments do you have?	More advertising, more connectivity to main campus, signage, communication about opportunities at the farm, college of agriculture weekly digest		

Note. [a]Total Respondents, n=130

Focus Group Question 6. What additional comments do you have? The additional comment section of the focus groups is where the group dynamic truly shined. The students fed off of one another to give what they seemed to think was the epic solution to all things regarding farm utilization. The recurring theme for question 5 seemed to resurface in this portion of the focus groups. Students highlighted the need for continuity between main campus and the farm as well as increased access and communication about what is going on at the farm. One student specifically said, "I know there is always something going on out at the farm, it's just I don't know when it is happening or sometimes don't find out until after the event". A group's solution to the communication problem that seemed to resonate very well with the students was an open forum, such as the College of Agriculture "weekly digest." Information about activities going on at the farm and how to get involved would be sent out in an open subscription text format, where students could elect to sign up to receive the weekly texts.

Summary

Across the country many colleges are facing the struggle of pinpointing the exact benefit and value of their college farm. This article serves to answer that overarching question and provide insight for other stakeholders to value and improve their on-campus farm facilities. The results indicate that the students in this research value the experiential opportunities on the farm, it has increased their understanding, confidence, and employability within the agricultural industry. They also have a hunger for participating in more activities when available. Additionally, one common theme from both the survey and the focus groups is that of communication. Communication about experiential opportunities is important to both students (so that they are aware and can actively participate) and the community (present value in the resource to the public and community image). An effective means of communication is a vital part of the puzzle.

Additional research on the topic includes understanding the cultural barriers that brought about the "clique" referenced in the focus groups and diving deeper into an understanding of this so that the barrier may more easily be removed. While the value and usefulness in student teaching is inherent to faculty and administration within college of agriculture, we hope that this paper will serve as guidance for improving those facilities and outwardly expressing the value of those facilities to outside stakeholders.

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