e-Journal of Business Education & Scholarship of Teaching
Vol. 14, No. 2, September 2020, pp: 19-32.
"http://www.ejbest.org"

Using A Three-stage Framework to Evaluate the Adoption of Service Learning of Agribusiness Students

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Abstract

This study develops a three-stage adoption framework to measure the impact of selected factors on a student's learning experience and evaluates the effectiveness of service learning in each learning stage. The agribusiness service-learning course utilized in this study matches groups of students with non-profit agribusiness entities to identify current business challenges and propose suitable solutions. A survey instrument was developed to gather student opinion data during the 2017-18 academic year and the multivariate Probit statistical method was used to analyse the data. The results demonstrate that service-learning helps students relate how course subject matter is used in everyday business operations and reveals that students commented positively about experiential learning throughout their projects. The analysis also demonstrates that younger, male, or white students are more likely to obtain a positive service-learning experience versus older, female, or non-white students.

Key words: *Service learning; agribusiness; active learning; student learning.*

JEL Classification: I21
PsycINFO Classification: 2227; 3530
FoR Code: 1301; 1302
ERA Journal ID#: 35696

Introduction

Service learning provides educational and personal benefits to students and has received considerable attention from higher education instructors and administrators. Research has shown that students taking service-learning courses advance their academic performance (as measured by GPA, writing skills, and critical thinking skills), develop a commitment to activism, and advance their self-efficacy and leadership skills (Astin, Vogelesang, Ikeda & Yee, 2000). Even though the impact of service learning on the education of business students was prominent, educators in agriculture and agribusiness have not yet explored its impact on students' success and satisfaction. Rather, agribusiness educational research has placed more emphasis on the importance of learning technologies (Gray, Diezel & Steel, 2019), blended learning (Pavla, Hana & Jan, 2015), E-learning (Feszterova, 2015), and learning communities (Laforge & McLachlan, 2018).

This paper focuses on the impact of service learning on agribusiness students' college education. Though many forms of service learning exist, this paper defines service learning using three features: 1) it offers opportunities to engage students in problem solving by requiring them to gain knowledge of their service-learning activities; 2) it promotes deeper learning because results are immediately visible; and 3) it involves cooperative rather than competitive experiences, thus promoting teamwork (Eyler & Giles, 1999). Specifically, the required agribusiness service-learning course for this study involves a group of students working with a non-profit agribusiness entity to address complex problems in real-world settings. Students spend a substantial amount of time engaging with assigned organizations helping to identify current business challenges. At the culmination of the course, they propose suitable solutions. This service-learning experience is a powerful tool for addressing learning outcomes associated with core agribusiness principles and problem-solving skills and facilitates students' application of what they learn in the classroom to solve agribusiness challenges. The service-learning activities not only strengthen students' academic, social, and real-world agribusiness connections, but also help them build a sense of respect for, and within, the agribusiness communities of which they are members. In this study service-learning is an integral part of the agribusiness curriculum, with service hours dedicated to local agribusiness organizations involved in irrigation, economic development, conservation, fish and wildlife, and equine, to name a few. When serving the organizations students participate in activities that emphasize learning by doing, allowing them to integrate what they are learning in this course, and others, into their service experience.

The purpose of this study is to understand the factors that affect students' service-learning experiences during the completion of twenty hours of service work. Specifically, this study quantifies the impact of students' demographics and opinions about service-learning knowledge formation, experience valuation, and critical reflective thinking. To measure the impact of select factors on students' learning experience, a three-stage adoption framework was created to evaluate the effectiveness of service learning in each learning stage of students' academic learning.

Service learning and Academic Learning

Service learning has been identified as having a positive impact on students' academic learning and career development (Eyler et al. 2001). Astin et al. (2000) gathered data from over 20,000 undergraduate students and used regression analysis to verify that service learning improves students' GPA, writing skills, and critical thinking ability. More importantly, service learning was found to be a tool for higher education to foster a sense of civic responsibility and community participation in students. The study also revealed that the strongest predictors of service-learning participation include volunteering and tutoring other students in high school and being female. The linkage

between community service participation and an increase in course-related knowledge and problem-solving skills was also recognized in other studies (Hamilton & Fenzel, 1988; Yorio & Ye, 2012; Guo et al. 2016).

Guo et al. (2016) used a set of classroom engagement questionnaires to test the effect of service learning on a sample of Chinese psychology students' problem-solving skills and found a positive impact of service learning on their ability to solve different types of problems. Specifically, service learning was found to deepen conceptual understanding, aid development of integrated and applicable knowledge, and transfer the knowledge learned in class to social practice. Moreover, their study demonstrated that service learning motivates enhanced classroom behaviour and improves class participation and activity engagement.

Academic research on service learning has also emphasized the benefits of service learning on students' psychological, social, and cognitive development. About fifty years ago, Conrad and Hedin (1982) studied 4,000 students over 30 study groups and found that students placed in experiential learning programs showed increased self-esteem and increased social and personal responsibility. Specifically, students showed increased self-esteem, improved moral reasoning, and enhanced personal responsibilities of feeling a sense of personal duty, concern for the welfare of others, and competency to act responsibly.

In contrast to these positive consequences, some studies revealed challenges faced by students when conducting service-learning activities. Previous studies examining the importance of emotions in the reflective practices employed in service-learning pedagogy found that "neglecting emotions in our classrooms and service-learning experiences may leave students to do their most difficult work alone," (Felten et al., 2006). Darby et al. (2015) further illuminated the divergent service-learning experiences of enjoyment, excitement, and stress, or worry. The results of these studies suggest faculty should incorporate reflective activities and offer support that addresses interactions with site supervisors and community members to assist students in their service-learning work. With dissimilar service-learning outcomes being reported, the reasons behind these learning outcomes were explored. Warter and Grossman (2002) demonstrated that individual characteristics could impact learning outcomes, and recognizing students' characteristics may provide an effective solution to help propose effective service-learning activities.

Recognizing the important role service-learning plays in students' academic success, recent service-learning research has explored ways to improve effectiveness in course design (Enos & Troppe, 1996; Mintz & Hesser, 1996; Howe et al. 2014). To this end, Howe et al. (2014) provided a comprehensive learning model to course design and suggested considerations for the instructor's role and students' responsibilities. The study focused on students' development and adoption phases to assess course design effectiveness and developed a three-phase model which includes students' exposure to service-learning (phase 1), students' responsibilities for taking on learning outcomes (phase 2), and students' ownership of taking on critical reflective thinking (phase 3). Results suggest that as students build learning capacity and become more responsible for what they need to learn to complete their projects, the faculty member's role should change to a consultant to support students in achieving success.

The Service-learning Course

A service-learning course was launched in the Agribusiness Department at a California State University in fall 2011. The purpose of the course is to provide students with unique opportunities to link their academic studies to community service. Twenty hours of service work are required to allow hands-on experience directly related to the course outcomes. The service-learning component of the course puts academics into

action and brings discipline-specific theory, factual knowledge, and best practices to life through service to local non-profit agribusiness organizations. It also provides students with the opportunity to practice professional skills by learning how to interact in a business environment as a representative of the department and the university. The service-learning components of the course are three-fold: 1) enhance academic learning, 2) provide meaningful service to the agricultural industry and the community, and 3) allow students an opportunity to conduct purposeful civic engagement. In contrast to the traditional discussion- and scenario-based agribusiness courses conducted at the university, this service-learning effort is committed to an experience that applies core concepts and skills to solving existing agribusiness challenges in an actual business setting.

The first step of the course is to explain university and course procedures, communicate expectations to the students, and design the learning activities. Groups of three to five students participate in information sessions designed to answer four questions: 1) What is service learning? 2) How to benefit the most from service learning? 3) What are the student's and faculty's responsibilities? and 4) What are the assessment and evaluation criteria? The first information session provides information to answer questions one and two. The second session discusses participation guidelines and explains how to handle any risks associated with service-learning activities. Information about liability insurance and injury and illness reporting is provided to students at this time. The third session emphasizes learning outcomes and evaluation of service-learning activities. Discussions focus on the university required reflective journal, the reflection rubrics, the required methods to track service hours, and group assignments to a community service organization. Throughout the semester the instructor checks in with students twice each week during scheduled course meetings and contacts the service-providing organizations frequently to evaluate student performance as well as address questions and concerns. Service providing organizations are invited to attend the end-of-semester group presentations made by their students to provide valuable input for evaluation of the service work and the presentations. Additionally, organizations are invited to vote for the 'best' summary poster at the end-of-semester competition and the selection of award-winning service teams for the projects.

This is the only required service-learning course for agribusiness majors and the twenty hours of service work are required to be completed with a non-profit organization. Students have the option to work with an organization assigned by the instructor or choose their preferred organization from a list provided by the university service-learning center. In the fall of 2017, student groups contacted ten of the twenty-three potential service-providing organizations recommended by the instructor and all of the organizations agreed to host a student group. After discussions between the students, the instructor, and the organizations, the finalized activities are outlined and written into each organization's service-learning contract. The contract is signed by the students, the faculty, and the organization supervisor during the first week of the project period, with the understanding that all students launch their project in the second project week. The instructor receives a service-learning hours tracking sheet signed by the supervisor of the service providing organization at the end of each service week. The student groups update the instructor about their work progress twice each week and the instructor contacts the service provider weekly or bi-weekly to check on progress.

Research methods

This study developed a new research method to understand agribusiness students' adoption of service learning, namely a three-stage adoption model. The study assumes students' adoption of service learning involves three-stages comprised of knowledge formation, valuation of the experience, and critical reflective thinking.

Stage I: Knowledge Formation

In this stage, a student enrolled in a service-learning course would actively learn the course content and understand the project format and requirements. The course content emphasizes an agribusiness management simulation software package in which each student group represents a hypothetical firm completing against other student firms. The simulation incorporates accounting, financing, marketing, personnel, and investment strategic management decisions and rules. Students are expected to apply the knowledge acquired during the simulation exercise to solve challenges discovered in the service-learning project.

Since students participate in three required information sessions offered by the instructor and the university service-learning center to learn about the project and its requirements, students are given access to sufficient information and guidance to aid in the completion of the service-learning project. It is assumed that when knowledge and information reach a threshold level, students will be confident to work on the service-learning on-site activities. In psychology educational literature, a link has been established between a student's profile and their knowledge formation and information acquiring behaviour (Pastor et al. 2007; Conley, 2012). Therefore, a student's optimal knowledge can be stated as a utility maximization problem relating to their profile:

$$K = f(p) \qquad (1)$$

Where K denotes the student's knowledge about course content and service-learning guidelines, which is a function of their profile p represented by age, gender, race, and the number of years in college. If the student perceives they are knowledgeable about course content and they are informed about service-learning guidelines, then K*= f (p) > k0, where K* is the optimal knowledge level and k0 is the threshold level. The student considers the knowledge obtained as being sufficient if and only if the knowledge level exceeds a given threshold level:

$$Y^{I^*} = K^*(p) - K^0 > 0 \qquad (2)$$

Otherwise Y^{I^*} = 0 when the student considers the knowledge as inadequate to help with the service-learning project.

Stage II: Valuation of the Experience

In this stage, a student's perceptions about service-learning activities and their demographic profile both affect their valuation of the planned activities:

$$V = f(j,c,s,t,i,p) \qquad (3)$$

Where V denotes a student's valuation about the service work. It is a function of job-related experience (j), the course content related to everyday life (c), the subject matter applied to everyday life (s), whether the task assigned was challenging (t), the level of involvement after the service work (i), and the student's profile (p). A student would positively value the service-learning work if and only if the perceived benefits exceed the perceived costs of getting the work done:

$$Y^{V^*} = E[f(j,c,s,t,i,p)] - E(c) > 0 \qquad (4)$$

Otherwise, Y^{V^*} = 0 when the perceived benefits do not exceed the costs.

Stage III: Critical Reflective Thinking

After discovering the meaning of service learning and being provided with information sessions to understand university protocols, rules, and requirements, students start the service-learning activities and engage in critical thinking to reflect upon improvements to the required activities:

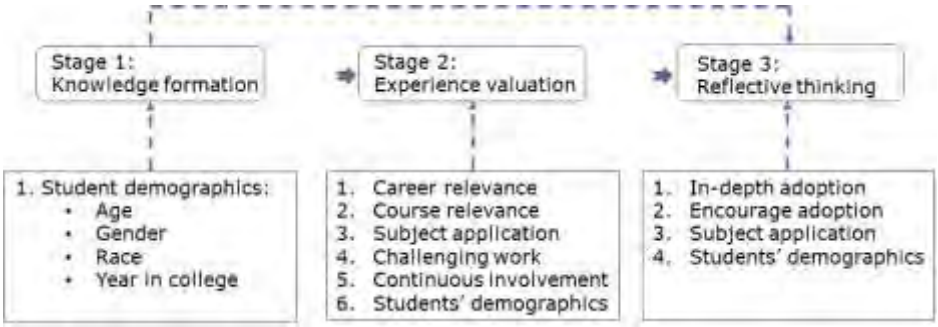
$$C = f(m,s,e,p) \qquad (5)$$

Where C represents a student's intention to propose changes or improvements for the existing project. The intention is a function of a few activities such as: 1) getting service learning incorporated into more courses on campus (m), 2) focusing on subject matter that is applied to everyday life (s), 3) encouraging other students to take a service-learning course (e), and 4) the student's profile (p). The student would propose a change to the existing service-learning activities if and only if the associated benefits exceed the costs:

$$Y^{C^*} = E[f(m,s,e,p)] - E(c_1) > 0 \qquad (6)$$

Otherwise Y^{C^*} = 0 when the associated benefits fail to exceed the costs. The conceptual model framework is presented in Figure 1.

Figure 1:
A Three-stage Conceptual Model to Describe College Students' Adoption of Service-learning



Survey Method and Results

Undergraduate agribusiness students, trained in survey administration, conducted face-to-face interviews with peer students taking the service-learning course during the spring and fall 2017 semesters. An online survey incorporating the same questionnaire was administered using Qualtrics during the fall 2018 semester but no data were gathered during the spring 2018 semester because the instructor was not teaching the course. All data were collected after the service work was completed. The survey administrators interviewed 128 students for the face-to-face survey and 119 of them completed the three-page questionnaire (a 93% response rate). All students enrolled in the course completed the online questionnaire during the fall 2018 semester. Students participating in the survey were not provided with bonus points nor grade incentives.

The first section of the survey asked students about their age, gender, race, and the number of years in college. The second section asked about the number of hours dedicated to completing the service-learning project, the perceived skills required to complete the service work, and the changes students would make to improve the service-learning outcomes. In the third section, students were asked to rate different aspects of their service-learning experience.

Table 1 presents the demographic information and service-learning assessment of the participating students. The sample includes an age range of 19 to 25 or older, with the majority 23 years and older (77%). The sample contains more male students (61%) than females (39%), with 65% of the students' white/Caucasian and approximately one-third (27%) Hispanic American.

Table 1:
Participating Students' Demographic Profile

Age	Counts	Percentage
19-20	4	2%
21-22	37	21%
23-24	63	36%
25 or older	72	41%
Total	176	100%
Gender		
Male	108	61%
Female	68	39%
Total	176	100%
Race		
Asian/pacific Islander	5	3%
Hispanic American	47	27%
White/Caucasian	115	65%
Other race	9	5%
Total	176	100%
Student classification		
Junior	2	1%
Senior	111	63%
5th year or longer	63	36%
Total	176	100%
Years of work experience		
0	8	5%
1 year	16	9%
2-3 years	32	18%
4-5 years	58	33%
6+ years	62	35%
Total	176	100%
First service-learning course?		
Yes	154	88%
No	22	12%
Total	176	100%
Hours per week dedicated to service-learning work		
0-1 hour	19	10%
2-3 hours	97	56%
4-5 hours	35	20%
6+ hours	25	14%
Total	176	100%
The most important skill required for service-learning work		
Problem-solving	57	32%
Communication skill	50	28%
Leadership	18	10%
Other skills	35	20%
Did not answer	16	9%
Total	176	100%
Are changes needed to make this course better?		
Yes	75	43%
No	97	55%
Did not answer	4	2%
Total	176	100%

Higher education research literature has not yet investigated the learning preferences of Hispanic agribusiness students and the results of this study may provide important insights about the preference for service learning among Hispanic students. Most of the surveyed students are seniors (63%) or those in their 5th or later years of college study (36%). About 95% of the students have at least one year of work experience and the majority of them (68%) have more than 4 years. This is the first service-learning course for most students (88%) and slightly more than one-half (56%) of the students spend 2-3 hours each week on their project, with another 34 percent spending 4+ hours each week. Students believe problem solving (32%), communication (28%), and leadership (10%) skills are the most important for the service-learning work. Forty-three percent of the students believe changes are needed to improve the learning experience, suggesting a revision of project requirements to make it more relatable to agribusiness management strategies and to reduce the hours required for the service work.

Section three of the questionnaire asked students to rate eleven aspects of service-learning using a one to five Likert scale, where one means they are the least satisfied with that aspect and five the most satisfied. An example statement reads, "I learn and understand course content best when it is related to a real-life situation." The means and standard deviations for each aspect are presented in Table 2. Analysis reveals the four aspects receiving the highest ratings are: 1) the real-life situations of service-learning aid the learning process, 2) the project and its requirements are easy to understand, 3) they will continue to be involved in community service/volunteering after completing the course, and 4) the project is challenging, meaningful and educational. The average rating of 3.58 out of 5 for the eleven aspects indicates service learning was perceived as a positive learning experience.

Table 2:
Students' rated satisfaction levels for eleven aspects of service learning

Service-learning evaluations	Number of observations	Mean	Standard Deviation
I learn and understand course-content best when it is related to a real-life situation.	175	4.09	0.91
The service-learning requirements/project was easy to understand.	175	3.86	0.99
I will continue to be involved in community service and volunteering after completing this course.	175	3.68	1.06
My site supervisor has provided me with a challenging, meaningful, and educational task.	175	3.61	1.05
I was involved in community service and volunteering before this course.	175	3.60	1.33
Overall, I enjoyed this service-learning project.	175	3.59	1.20
The service aspect of this course has helped me relate how the subject matter is used in everyday life.	175	3.46	1.20
I will encourage other students to take a service-learning course.	175	3.46	1.19
My service-learning project is providing me with experience related to my career.	173	3.36	1.19
I knew what service learning was before taking this course.	168	3.35	1.33
Service learning should be incorporated into more courses on campus.	175	3.31	1.31

Although student satisfaction ratings illustrate positive evaluations about service learning, further analysis is required to establish the linkages between knowledge formation, the learning experience, and reflective thinking. Therefore, a three-stage conceptual model was developed and tested using a multivariate Probit procedure. The goals of the model are three-fold: 1) test the linkage between knowledge formation and the positive experience, 2) verify the connection between the positive experience and reflective thinking, and 3) analyse the linkage between knowledge formation and reflective thinking. Table 3 contains definitions of the dependent and independent variables, how the variables were coded in the model, and the means and standard deviations.

Table 3:
Independent and dependent variable definitions

Dependent variable explanation	Variable coding	Mean	Standard Deviation
I knew what service-learning was before taking this course	1 if strongly agree or agree; 0 otherwise	0.73	0.45
I enjoyed this service-learning project	1 if strongly agree or agree; 0 otherwise	0.84	0.37
Changes should be made to this course	1 if strongly agree or agree; 0 otherwise	0.43	0.49
Independent variables	**Variable coding**	**Mean**	**Standard Deviation**
Age	1 if 22 years or older; 0 otherwise	0.41	0.49
Gender	1 if male; 0 female	0.61	0.48
Student classification	1 if senior; 0 otherwise	0.63	0.48
Race	1 if white/Caucasian; 0 otherwise	0.65	0.47
Help	The course helped me relate how the subject matter is used in everyday life. Yes=1; No=0	0.57	0.49
Continue	I will continue to be involved in community service after this course. Yes=1; No=0	0.59	0.49
Content	I understand course content best when it is related to a real-life situation. Yes=1; No=0	0.82	0.37
Challenge	Service learning provided me with a challenging, meaningful & educational task. Yes=1; No=0	0.63	0.48
Experience	Service learning provided me with experience related to my career. Yes=1; No=0	0.5	0.5
Encourage	I will encourage other students to take a service-learning course. Yes=1; No=0	0.5	0.5
More service-learning	Service learning should be incorporated into more courses on campus. Yes=1; No=0.	0.46	0.5

The results of the multivariate Probit model are presented in Table 4. The model's goodness-of-fit is statistically significant at the 1% level, meaning that the selected independent variables are effective in explaining changes in the dependent variables. The estimated correlations between error terms for equations (2) and (4), and equations (4) and (6), are statistically significant at the 5% level. This indicates that the equations for each stage should be estimated simultaneously using the multivariate estimation procedure and that it is theoretically inappropriate to separate the three stages and only examine the causal relationship between any two stages. It is also inappropriate to analyse students' opinions in each stage without consideration of

sequencing stages because it will lead to inaccurate results. The model demonstrates the existence of a three-stage adoption sequencing framework such that classroom learning contributes to a positive on-site experience, which further impacts students' reflective thinking and willingness to comment on the project experience. The likelihood ratio test being statistically significant at the 1% level further confirms the strong correlation between stages.

It is important to understand the impact of specific factors on each stage of service-learning adoption to plan for effective project design. In the first stage of knowledge formation estimation, the expectation is that students' demographic profiles affect the understanding of course content and the service-learning guidelines. Students' age was found to impact negatively knowledge formation, meaning that students 22 years old or younger are less likely to have formed the knowledge needed for the service-learning project (alpha < 1%). However, students' gender was found to have a positive impact on knowledge formation, meaning that male students believe they were prepared to use course content knowledge to solve real-world problems raised in the service-learning project (alpha < 5%). The sample also demonstrates that students' race and university classification level (senior, junior, etc.) do not change knowledge preparedness for the service-learning project.

In the second stage of experience valuation estimation, results indicate a service-learning project that is challenging, meaningful, and educational provides students with a positive learning experience (Challenge, alpha < 1%). This result confirms findings from the qualitative data gathered through students' reflective journals. For example, the course spends about a week covering business budgeting using an Excel worksheet in conjunction with a hypothetical agribusiness firm. Later, a group of students had the opportunity in their service-learning project to learn new accounting software and to create a budget performance report based on per acre farm output. Even though the project was said to be challenging, difficult, and time-consuming, students commented on the project as being "beneficial to work with actual business numbers" and the project provided "a way to more actively contribute to a real agribusiness and to help with their needs."

The coefficient estimate for the help variable was positive and statistically significant at the 1% level, which suggests that if a student believes the service-learning project helps them relate how the subject matter is used in everyday life, they are more likely to comment positively on the experience. This was confirmed by information gathered from the reflective journals in which almost all students commented positively about hands-on learning throughout the service-learning project. For example, various marketing strategies are discussed in class before the simulation and service-learning component. When working on their service-learning project, students realized the application of this knowledge when they said "we reached out to various farmers' market locations that sell persimmons to see how they feel the product is flowing in and out of their stands, and if the target market demographics are diverse or if it is the Asian cultures that are native to this fruit … the project allowed me to analyse how the persimmon market is a niche market."

The third stage of reflective thinking investigates the impact of selected factors on critical thinking to suggest improvements for the required service-learning activities. First, White/Caucasian students seem more likely to propose improvements in service-learning design (Alpha < 10%). About 65% of the students in the sample are White/Caucasian, a percentage that is much higher than university racial demographics that show 21% of the population as White and 48% Hispanic. Second, if a student is willing to encourage other students to take a service-learning course, they are less likely to propose improvements to the service-learning design, which indicates the student is satisfied with the existing design (Alpha < 5%). Many students commented in their reflective journal that the project is, "an excellent project and I encourage other

students who take this course to choose this project". Third, the help variable was negative and statistically significant, meaning that if a student believes the service-learning project helps them understand how the subject matter is used in everyday life, they are less likely to propose improvements to the project design (Alpha < 1%).

Table 4:
Results of the three-stage conceptual model

Stage 1: Factors affecting students' knowledge about service learning.		
	Coefficient from multivariate Probit	P>|z|
Age**	-0.78	0
Gender*	0.47	0.04
Race	0.33	0.14
Student classification	0.28	0.21
Stage 2: Factors affecting students' experience with service learning.		
Age	0.06	0.83
Gender	-0.03	0.92
Race	-0.12	0.69
Student classification	-0.32	0.29
Experience	0.09	0.77
Challenge***	0.86	0.01
Content	0.43	0.16
Continue	0.15	0.61
Help***	0.95	0.01
Stage 3: Factors affecting students' reflective thinking to improve the project or not.		
Age	0.34	0.12
Gender	-0.32	0.15
Race*	0.41	0.09
Student classification	-0.01	0.99
Help***	-0.74	0.01
Encourage**	-0.53	0.05
More service-learning	*-0.02*	*0.92*
Correlation coefficients from multivariate Probit		
Stages 1 and 2 are correlated (rho 21)**	-0.37	0.04
Stages 2 and 3 are correlated (rho 32)**	0.35	0.04
Stages 1 and 3 are correlated (rho 31)**	*-0.37*	0.01
Likelihood ratio test shows that rho21 = rho31 = rho32 = 0 can be rejected		
Model goodness of fit	P>Chi2	0.00
# of observations	172	

Conclusion

As service learning becomes an increasingly significant practice in education, agribusiness educators have started to understand that service learning can improve the learning of course content and enhance students' participation in real-world problem solving. This study develops a three-stage adoption framework and analszes the framework within an agribusiness service-learning course to determine how students' profiles and their perceived benefits of service learning add to the overarching goal of attaining learning outcomes. The results suggest that agribusiness educators should integrate all three stages of learning into the design of their service-learning pedagogy. The three stages of knowledge formation, experience evaluation, and critical thinking are inseparable, and overlooking any stage will result in reduced participation in effective experiential service learning. It should be noted that this study is based on a service-learning course with a large number of students enrolled and these students are working on various group projects. Therefore, the large enrolment and group project situation may stimulate knowledge exchange and contribute to collaborative reflection and effective learning implementation.

The sample population demonstrates that younger, male, or white students are more likely to obtain a positive learning experience from the service-learning project. These students tend to benefit significantly from the course content and the service-learning project, and thus are enthusiastic about the educational method employed in this study. They also comment positively about the course and project design, are more likely to obtain a satisfactory learning experience, and are likely to recommend the course and project to fellow students. Thus, it is critical to schedule the service-learning project in the early stage of their college study and, when designing student groups, it is suggested to mix races and genders in each group to contribute to a positive learning experience for all group members.

The analysis results are also positive concerning the linkage between the tasks of the service-learning project and the reported learning experience. Even though the opinion may not be invariable, the statistical procedure employed demonstrates that students want their instructor and the on-site supervisor to provide them with challenging, meaningful, and educational tasks. Information gathered in the reflective journals also shows that students want the service-learning projects to reinforce what they are learning in the classroom and prompt them to extend their learning to solving real-world agribusiness problems. When applying their knowledge to develop solutions for an agribusiness, students may respond differently to the needs of the assigned organization, depending on the interests, knowledge base, and the organizational structure of the student's group. Thus, there is no one-size-fits-all evaluation for student success. As long as the learning outcome reflects the student's effort and they accomplished the required hours, the service-learning project is considered successful. However, students do seek pleasure in their service-learning work and they want to avoid frustration resulting from: 1) inefficiency in the course and project design, 2) lack of communication between the instructor, site supervisor, and the student team, and 3) being provided with a task that is by no means challenging and interesting.

This study is a start to answering questions regarding service learning in agribusiness education. Much remains to be done such as identifying the group of students that benefit the most from the service-learning approach, developing a scoring system to measure the difficulty level of a service-learning program, and understanding the long-term impact of the program on agribusiness education. Nonetheless, results from this study suggest implications that are worthy of consideration. The study demonstrates that service learning is effective in promoting agribusiness learning and it can promote learning more effectively when combined with classroom instruction. Thus, service learning should be adopted and expanded to more agribusiness programs, and the promotion of service learning should become an important element of agribusiness education.

Acknowledgement

We thank Dr. Annette Levi for assistance with English editing and for comments that greatly improved the manuscript.

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