

Integration of Service-Learning in Animal Science Curriculum¹

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Abstract

Service-learning extends students' learning by adding a "real world" dimension to their education while simultaneously providing a service to the public. This teaching methodology is a component of Animal Systems Management and Dairy Linear Evaluation courses at the University of Minnesota Crookston (UMC). The first course is a senior level capstone course where students conducted farm analyses and provided specific recommendations for dairy, beef, goats, swine or horse producers. The second course is a lower division course where students worked with a Holstein consultant in developing computerized sire mating recommendations for dairy producers. Students enrolled in these courses were required to complete service-learning projects to successfully complete the courses. Students experienced how formal learning connects with real-world situations. They gained knowledge while becoming more effective communicators and problem solvers. Their ability to work as a team was enhanced and their leadership skills improved. By working with the community, students gained a sense of civic responsibility, with an increased awareness of community problems. Farmers gained new knowledge and benefited from the service provided. The Holstein consultant gained new clients. More than 85% of students indicated they had a positive experience with service-learning projects and a positive experience working with farmers.

Introduction

The National and Community Service Act of 1990 defines service-learning as an initiative in which students learn and develop through active participation in thoughtfully organized service experiences that meet actual community needs and coordinate in collaboration with the school and community (Brubaker and Ostroff, 2000). Since the early 1990s, educators have become interested in reconnecting higher education with local communities for experiential learning and service (Zlotkowski, 2000). Models of integration of service-learning with academic studies have been demonstrated in disci-

plines such as biology (Kennell, 2000), anthropology (Keene and Colligan, 2004), archaeology (Nassaney, 2004), and general sociology (Strand, 1999; Ostrow, 1999). There are at least 20 handbooks published by the American Association for Higher Education that deal with integrating community service-learning in specific disciplines. Integration of service-learning to Animal Sciences curriculum is not common. A review of literature indicated two reports (Brady et al., 2005; Moody et al. 2005) of service-learning in Animal Sciences.

The University of Minnesota, Crookston uses a polytechnic approach that combines theory, laboratory experiences and technology to deliver undergraduate education. UMC also provides a link to the region for teaching, research and outreach activities with emphasis on meeting the needs of rural Minnesota. The majority of Animal Science courses use farm settings for laboratory and "hands on experiences." Service-learning methodology is a natural fit to UMC polytechnic teaching philosophy. It is a vehicle that allows community service and classroom learning to join in the Animal Science curriculum. For over ten years, service-learning has been an integral component (30%) of the Animal Systems Management course. Recently, it has been implemented in the Dairy Linear Evaluation class. The objective of this paper is to discuss how service-learning was incorporated in two different Animal Science courses. The methodology could be a successful experiential learning technique for other agricultural courses.

Methods

Animal Systems Management Course

This course was developed over 10 years by two instructors as a 4 credit capstone senior-level class to enhance student learning and use that learning to help local farmers in the management of their operations. Dairy and beef cattle, sheep, goats, swine and horses were the main animal systems used. Eight to ten students were annually enrolled in the course. Students were required to complete a service-learning project to successfully pass the class. The

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service they provided to farmers was a complete farm analysis or SWOT (strengths, weaknesses, opportunities, threats) with feasible recommendations to be considered by farmers for implementation in order to improve overall farm profitability and sustainability. During the preparation (reflection) phase of the project, students were exposed to service-learning concepts described by several authors (Kendrick, 1999; Kennell, 2000; Schensul and Berg, 2004). Students were also required to review previous service-learning projects completed by UMC students formerly enrolled in the Animal Systems Management course. Key essential issues to the farm analysis were taught in the classroom as course modules. The issues included farm finances, labor, production, marketing, facilities and environmental problems. Students used information drawn from these modules and from their own experiences to complete the project.

A special emphasis was put on a small “team” approach where three to four students work together on a farm of their choice. Each team focused on solving problems that farmers saw as very important to them, but with achievable goals. Each team was required to write a report containing specific recommendations and orally present these recommendations to farmers. In selecting team members, it was particularly important to pay attention to students' academic levels, farm backgrounds, farm species of interests, living situations and personalities. Students with similar types of personalities, same animal species of interests, similar farm background and living in close proximity to each other were selected as teams. In a few instances, students groups were dysfunctional due to unforeseen differences in personalities.

The following methodology was used to conduct the service-learning projects:

- a) At the beginning of the course, instructors located farms that met course educational needs and were willing to participate;
- b) Instructors made contacts with farmers several weeks before the farm visit to get their commitment to participate and set dates of team farm visits, tasks and goals of the service-learning project;
- c) Farmers were made aware that no parties could be held liable for accidents or outcomes of the project. A liability disclaimer was signed and dated by both farmers and students;
- d) Students (team) and instructors visited twice (at minimum) each farm site. The first visit was to make a thorough examination of the whole operation, tour facilities, gather information and ask questions of the farm family. The whole farm family and hired workers were invited to participate in the discussions. Students discussed issues with farmers ranging from production, productivity, labor, farm finances, marketing, animal facilities to environmental system management. The importance of each issue discussed depended on farm specific problems

and interests. At the end of the first visit, which took about four to five hours, student collected farms records for further analysis and classroom discussion. During the second visit, the team presented the full report containing the result of the SWOT analysis, discoveries, and recommendations to the farm family. Recommendations from students were prioritized and had to meet farm goals. These recommendations had to be research based and deemed agriculturally valid by courses instructors. Results had to be accepted by students and farmers;

e) At the completion of the project, both students (Table 1 through 5) and farmers (Table 6) complete a post-evaluation survey. The student survey was designed by the UMC Service-Learning Office for usage in all UMC courses that utilize service-learning. The survey for farmers was designed by Animal Science faculty.

The grade for the project was based on team presentation (100 points), team written report (100 points) and personal effort of each student in the project (200 points). It was especially important that students understood that teamwork and active participation were expected and that they were not evaluated on the nature of the service performed rather credit was awarded for how well they carried out the project. This included the depth and agricultural soundness of students' recommendations. Individual student time involved in each project averaged nearly 50 hours over the entire school semester for a 4 credit course. Student time included classroom time, farm visits and outside class work.

Dairy Linear Evaluation Course

This course has been taught for over 15 years, but 2004 was the first year it was taught with a service-learning component as part of the class requirements. Dairy Linear evaluation is a tool used by nearly half of all dairy producers in the United States to improve functional type. Dairy linear evaluation involves teaching students to code 16 physiological traits (i.e. stature, rear legs, fore udder attachment, etc.) between biological extremes. A scoring system of 1-50 points was used with 25 being the mid-point. A score of 1 point is the most limiting biological extreme for all traits; a score of 50 points is the opposite biological extreme but not necessarily ideal for every trait. Once students became somewhat adept at scoring cows, they were taught to use all sire data including average linear data for sire daughters. Students became familiar with how linear traits can be used in mating to improve functional type. Students selected a herd that was going to be classified by the Holstein Association during the semester to complete an individual service-learning project.

The first step in the service-learning project was to observe the professional Holstein Association Classifier code the cooperating herd. Students built a rapport with the dairy farm family by visiting during the classification process. After the classification was

completed, students visited with the farm family about the standards they wished to use when mating their herd. This may include Predicted Transmitting Abilities (PTA) for milk, protein, milk fat, type, etc. It could also include Type Production Index (TPI), price per unit specifications, Net Merit (NM) or linear standards for certain traits. A few weeks elapsed as all students completed the first step and the Holstein Association processed the classifier's work for each farm. The Holstein consultant in the area traveled to UMC to teach students a computerized dairy mating program ("Holstein Association MultiMate" program). After students learned the program, they individually practiced their skills by mating their assigned herd using the standards given to them by the farm. The consultant examined the results, offered suggestions and assisted in interpretation of matings. The final step required the students to travel to the farm, present a hard copy of the mating results and offer the farm family thoughts in how to incorporate the results into their present mating program. Fifteen percent of each student's grade was attached to the service-learning component of the Dairy Linear course. This corresponded to about 10 hours of effort in a one credit course. Students completed the same survey as in the Animal Management course. The survey for farmers was not used in this course.

Results and Discussion

Animal Systems Management Course

Numerous service-learning projects were completed by students over a 10 year period in Animal Systems Management. These projects were approximately 30% of the course expectations. These projects provided students with a mechanism to gain experiential learning in rural settings. Working in small groups, students conducted analysis of several farm operations. Examples of students' recommendations for selected projects are presented in this section.

A. Students' service to a 300 cow dairy farm

This 300-cow free-stall dairy operation is located in west central Minnesota. After completing the SWOT analysis of the operation, students made the following recommendations:

- Expand the herd size to 400 cows to fully utilize many un-used stalls. This allows the farm to operate to full capacity;
- Hire a new herdsman to improve overall farm management and free some time for the farm family to focus more on high quality crop production and enjoy leisure time;
- Implement a cow body scoring system to help manage feeding programs, improve herd health and reproductive performance;
- Control Johne's disease while expanding the herd was critical to the success of the operation. Students suggested that the farmer gets the herd on

the Minnesota Johne's testing program, which pays for half of the cost. Students also provided information to the farmer on how to get on the state testing program for this disease;

- Good nutrition is one of the keys to milk production and herd health. Students formulated a new diet for the cows that resulted in higher milk production (5 to 10 pound increase in milk production/cow/day);
- Finally, students recommended that the farmer re-groove the very slippery cement floor to minimize feet and legs injuries to cows.

After implementing these recommendations, herd health, nutrition, profit and overall farm management were greatly improved.

B. Other successful service stories

1. Dairy operation students recommended to either expand the operation with new investment or sell out. The farmer decided to sell out;
2. Beef operation students recommended to eliminate one of several breeds used in the breeding program and the farmer followed their recommendation;
3. Dairy operation with milk bottling and yogurt processing plant students helped develop a web site to expand product marketing share;
4. Horse production and training facility students recommended that the trainer's contract be discontinued because of poor job performances and the farmer did cancel the contract;
5. Sheep farm - students suggested that the farmer reorganize finances by selling idle assets and reinvesting in productive assets. Farmer did implement students' advice and improved financial situation the following years.

Dairy Linear Evaluation Course

Service-learning was only used one year in this course; therefore, its impact is not as evident. However, students agreed that it should be implemented in the course again in future years. The Holstein consultant also felt the project fit his criteria for outreach and allowed him access into herds that were not using his program. Farmers received two hardcopies of computerized sire mating recommendations; one with the sires that met their sire selection criteria and one with three matings for each cow. Usage of that information and resulting offspring will not be available for three years; therefore, it will be some time before management impact for dairy farms can be evaluated. Protocol for this service-learning project is being studied. Slight revisions will be made in the presentation of mating results on the final student visit to each dairy farm.

Evaluation

Service-learning survey responses from 21 students for the Animal Systems Management

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Course in 2004 and 2005 and Dairy Linear Evaluation Course in 2005 have been combined for all subsequent discussion and tables. For discussion purposes, the use of “agreed” throughout the text means “agreed and/or strongly agreed” and disagree means “disagreed and/or strongly disagreed.”

Responses to questions related to students' class attendance and their understanding of service-learning concepts (Table 1) indicate 68% to 91% of students agreed with the following statements:

a) The service activities I performed in this class made me more interested in attending this class;

b) The service activities performed in this class made me interested in studying harder;

c) Implementing service-learning in this class helped me understand the basic concepts and theories of the subject matter I studied in this class;

However, only 52% of students agreed that structured activities in the class provided them with a way to analyze issues about citizenship, social responsibility or personal responsibility in the community; 14% were neutral and 24% disagreed with this question. Students' responses to this question were somewhat skewed because after survey, students said they did not understand how service-learning in Animal Science affects their citizenship, so the question was not clearly understood. This is probably because the survey designed for all UMC service-learning courses was too general and the question did not apply well to all students.

Responses to how students integrate learning into their behavior (Table 2) show that 90% to 95% of students agreed with these statements:

a) I learned more in this class by getting hands-on experience in the community rather than if I would spend most of the class time in a traditional lecture setting;

b) Through my service-learning project, I learned the value of communication;

c) Through my service-learning project, I improved my critical thinking skills;

d) Some educators say that 'real learning' means being able to integrate learning into your own behavior. With that definition, do you believe that this class was successful in helping you 'really learn'?

Table 1. Responses of Students (21) to Questions Related to Class Attendance & Understanding of Service-Learning Concepts Used in Animal Systems Management Course (2004 and 2005) and Dairy Linear Evaluation Course (2005)

Q.1. The service activities I performed in this class made me more interested in attending class.

Question	Count	Percentage Answered
1. Strongly agree	5	23.8%
2. Agree	9	42.9%
3. Neutral	6	28.5%
4. Disagree	1	4.8%
5. Strongly disagree	0	0.0%

Q.2. The service activities performed in this class made me interested in studying harder?

Question	Count	Percentage Answered
1. Strongly agree	5	23.8%
2. Agree	11	52.4%
3. Neutral	4	19.0%
4. Disagree	1	4.8%
5. Strongly disagree	0	0.0%

Q.3. Doing Service-Learning in this class helped me understand the basic concepts and theories of the subject matter I studied in this class.

Question	Count	Percentage Answered
1. Strongly agree	9	42.9%
2. Agree	10	47.6%
3. Neutral	2	9.5%
4. Disagree	0	0.0%
5. Strongly disagree	0	0.0%

Q.4. Structured activities in the class provided me with a way to analyze issues about citizenship, social responsibility, or personal responsibility in my community.

Question	Count	Percentage Answered
1. Strongly agree	4	19.0%
2. Agree	9	42.9%
3. Neutral	3	14.3%
4. Disagree	4	19.0%
5. Strongly disagree	1	4.8%

Students listed the following skills gained or improved through service-learning:

- Ability to work in a team environment;
- Gaining new knowledge and becoming more self-confident;
- Improved leadership, communication and critical thinking skills;
- Gaining a sense of civic engagement with the local community.

These skills developed by service-learning students were reported by other studies (Elder et al. 2005; Marullo, 1999; Moody et al., 2005).

Responses to questions related to collaboration and team work (Table 3) indicate 81 to 95% of students agreed with these statements:

a) The course helped me bring the lessons I learned in the community back into the classroom;

b) Through the course I had the opportunity to share my experiences and the lessons learned in the community with other students;

c) Through my service-learning project, I learned the value of working with others.

However, only 67% of students agreed to the idea of combining service to the community and university course work with more classes at UMC. About

23% of students were neutral and 10% disagreed. Students who disagreed indicated that service-learning should not be a component of any courses but those with goals that strictly match community needs. This argument is in perfect agreement with service-learning concept of matching learning with community service (Brubaker and Ostroff, 2000).

Responses to questions related to the service performed (Table 4) show that more than half (52%-86%) of the students agreed that their projects provided a needed service to individuals in the community. Also they indicated the class helped them become more aware of community problems and interested in helping to solve them.

Responses to questions related to students' overall rating of service-learning experience and their satisfaction working with farmers (Table 5) indicate that more than 85% of students said they had a positive experience. The majority of students (95%) recommended that UMC continues service-learning

projects with farmers. Their specific reasons for recommending continuing service-learning are reported in Table 5.

The summary of farmers' survey (Table 6) for the Animal Systems Management course indicates that students did a "good" to an "excellent" job in presenting their projects' goals and recommendations to farmers. Farmers rated "good" to "excellent" the service they received from students. All farmers were impressed and satisfied with students work. Farmers were willing to be involved in future projects with UMC.

The following are specific comments made by farmers not incorporated in Table 6.

- a) "Students' efforts to look at a situation and make decisions shows their maturity;"
- b) "Thank you so much, the rations you formulated for our cows made a big difference;"
- c) "Students had excellent ideas and they reinforced some of the things we had in mind before the service-learning project;"

d) "This is a good learning opportunity for both students and us (farmers). The service they provided to us is very useful and will be put to use on the farm."

Mutual Benefits

Post service-learning evaluations indicated the students, farmers and the Holstein consultant mutually benefited from the experience. By completing these service-projects, students experienced how classroom learning connects with real world situations. Students' cognitive skills were enhanced through critical analysis and farm problems solving. For example, formulating a dairy diet to improve milk production requires students to have special knowledge in dairy nutrition, feeds and feeding and general feeding management. Farmers gained new knowledge and the service provided. The service gained could be translated into more profitable and sustainable farms. The Holstein consultant could also expand his customer base. Student learning and service provided are keys features of service-learning. This was recognized by Kendricks (1999) and Marullo

Table 2. Responses of Students (21) to Questions Related to Integrated Learning in Animal Systems Management Course (2004 and 2005) and Dairy Linear Evaluation Course (2005)

Q.1. I learned more in this class by getting hands-on experience in the community rather than if I would spend most of the class time in a traditional lecture setting.

Question	Count	Percentage Answered
1. Strongly agree	9	42.9%
2. Agree	10	47.6%
3. Neutral	2	9.5%
4. Disagree	0	0.0%
5. Strongly disagree	0	0.0%

Q.2. Through my service-learning project, I learned the value of communication.

Question	Count	Percentage Answered
1. Strongly agree	8	38.1%
2. Agree	12	57.1%
3. Neutral	0	0.0%
4. Disagree	1	4.8%
5. Strongly disagree	0	0.0%

Q.3. Through my service-learning project, I improved my critical thinking skills.

Question	Count	Percentage Answered
1. Strongly agree	7	33.3%
2. Agree	13	61.9%
3. Neutral	0	0.0%
4. Disagree	1	4.8%
5. Strongly disagree	0	0.0%

Q.4. Some educators say that 'real learning' means being able to integrate learning into your own behavior. With that definition, do you believe that this class was successful in helping you 'really learn'?

Choice	Count	Percentage Answered
1. Yes	20	95.5%
2. No	1	5.5%

Q.5. List main skills you used or acquired through your service-learning project

- Working in a team environment, improved public speaking, confidence
- My previous knowledge
- Communication and critical thinking
- Improved listening skills
- Improved leadership skills
- Gain of sense of civic engagement with my community

Table 3. Responses of Students (21) to Questions Related to Collaboration and Team work in Animal Systems Management Course (2004 and 2005) and Dairy Linear Evaluation Course (2005)

Q.1. This course helped me bring the lessons I learned in the community back into the classroom.

Question	Count	Percentage Answered
1. Strongly agree	12	57.1%
2. Agree	7	33.3%
3. Neutral	1	4.8%
4. Disagree	1	4.8%
5. Strongly disagree	0	0.0%

Q.2. Through the course I had the opportunity to share my experiences and the lessons learned in the community with other students.

Question	Count	Percentage Answered
1. Strongly agree	7	33.3%
2. Agree	10	47.6%
3. Neutral	4	19.1%
4. Disagree	0	0.0%
5. Strongly disagree	0	0.0%

Q.3. Through my service-learning project, I learned the value of working with others.

Question	Count	Percentage Answered
1. Strongly agree	9	42.9%
2. Agree	11	52.3%
3. Neutral	0	0.0%
4. Disagree	1	4.8%
5. Strongly disagree	0	0.0%

Q.4. The idea of combining service to the community and university course work should be practiced in more classes at UMC.

Question	Count	Percentage Answered
1. Strongly agree	5	23.8%
2. Agree	9	42.9%
3. Neutral	5	23.8%
4. Disagree	2	9.5%
5. Strongly disagree	0	0.0%

Why or Why not?

Service-learning projects should be incorporated only in courses with goals that match community needs.

Table 4. Responses of Students (21) to Questions Related to the Service Provided in Animal Systems Management Course (2004 and 2005) and Dairy Linear Evaluation Course (2005)

Q.1. The service-learning project, I completed in this class provided a needed service to individuals in the community.

Question	Count	Percentage Answered
1. Strongly agree	6	28.6%
2. Agree	12	57.1%
3. Neutral	1	4.8%
4. Disagree	2	9.5%
5. Strongly disagree	0	0.0%

Q.2. This class helped me become more aware of community problems.

Question	Count	Percentage Answered
1. Strongly agree	2	9.5%
2. Agree	9	42.9%
3. Neutral	5	23.8%
4. Disagree	5	23.8%
5. Strongly disagree	0	0.0%

Q.3. This class helped me become more interested in helping to solve community problems.

Question	Count	Percentage Answered
1. Strongly agree	4	19.0%
2. Agree	8	38.1%
3. Neutral	5	23.8%
4. Disagree	4	19.1%
5. Strongly disagree	0	0.0%

(1999) who indicated that when service and learning were properly integrated, the service contributes to learning in the classroom and the classroom experience enhances what students gained from the service.

What Have We Learned about Service-Learning?

a) Service-learning is not a side activity, but an alternative teaching method. Therefore, thoughtful planning is required to smoothly integrate it into course work. It takes a considerable amount of time to organize a course syllabus, set courses and farm sites goals, contact farmers, schedule site visits and prepare students to the process. Service-learning projects require significant class and out of-class time commitments of both the instructor and students. The instructor must be involved from start to finish of a project. He or she must be actively involved in communicating course objectives, contacting farmers, gathering information on farmers' needs, orienting and training students to conduct the project. Students must be actively involved in assessing farmers' needs and engaged in reflection (i.e. SWOT analysis) and learning (i.e. Holstein MultiMate program and classroom information) activities. This challenges them to connect services activities to course objectives and to develop higher level thinking and problem solving skills. In the Animal Systems Management class each student devoted about 50 hours to the project.

b) Project results must be accepted by farm families for the service-learning project to be a successful one. Farm recommendations made by students which are not within the feasible parameters of

Table 5. Responses of Students (21) to Questions Related to overall rating of Service-Learning in Animal Systems Management Course (2004 and 2005) and Dairy Linear Evaluation Course (2005)

Q.1. Overall rating of the service-learning experience

Question	Count	Percentage Answered
1. Positive	18	85.7%
2. Neutral	3	14.3%
3. Negative	0	0.0%

Q.2. Overall satisfaction with the farmers and farm sites

Question	Count	Percentage Answered
1. Positive	18	85.7%
2. Neutral	3	14.4%
3. Negative	0	0.0%

Q.3. Would you recommend the Animal Science program continue to work with this client/agency/site in future years?

Choice	Count	Percentage Answered
1. Yes	20	95.0%
2. No	1	5.0%

Why or why not?

- If you were to go into a field where these skills were necessary, then it only enhances your thinking and knowledge;
- Very nice and profitable farms;
- It is a good way to learn from a real, producing farm, not just from a book;
- These producers have been farming for years and can tell you what works and what doesn't;
- This experience was really worth the time put in it;
- This was a great project. It was exciting to work with farmers and school work, the two most important things in my life right now;
- Who would have ever thought I would have learned this much. It was really worth the time;
- The Holstein association that taught us the software program for mating cows was very helpful.

Table 6. Farmers' rating of Service-Learning (15 farm sites) in 2003-2005 for the Animal Systems Management course.

	Excellent 4	Good 3	Fair 2	Poor 1
Please rate questions 1-6 on a scale of 1- 4				
1. Did the students present their project goals clearly?	87.5%	12.5%	0.0%	0.0%
2. Did the students present information accurately?	50.0%	50.0%	0.0%	0.0%
3. Did the students visit or call you after the initial farm visit?	100.0%	0.0%	0.0%	0.0%
4. Did the students meet your expectations by making suggestions within your feasible parameters?	75.0%	25.0%	0.0%	0.0%
5. How would you rate the usefulness of this project to your farm?	87.5%	12.5%	0.0%	0.0%
6. What is your overall impression of students' work?	87.5%	12.5%	0.0%	0.0%
Please answer Yes or NO to questions 7 and 8.				
	Yes		No	
7. Are you going to implement any of students recommendations	100.0%		0.0%	
8. Are you willing to be involved in future projects with UMC's service-learning students?	100.0%		0.0%	

farmers and undesirable sire-dam mating for specific traits are rejected by the farmers.

c) When using small teamwork approach, student group dynamics is an important factor to take into consideration when assigning individuals to a group. It is particularly important to pay attention to students' academic levels, farm backgrounds, farm species of interests, living situations and personalities. Students with same types of personalities, same animal species of interests and living in close proximity to each other tend to work together more efficiently than students who do not share these characteristics. In a few instances, students groups were dysfunctional due to differences in personalities.

Summary

Service-learning can be a successful experiential learning approach if carefully implemented in academic curricula. It must be relevant to a curriculum or specific courses for maximum students' learning to take place. In both classes, students provided a needed service to farmers. From post experience evaluations, students and farmers stated they mutually benefited from service-learning. Students experienced how formal learning connects with real-world situations. They gained knowledge while becoming more effective communicators and problem solvers. Their ability to work as a team was enhanced and their leadership skills improved. Working with the community, students gained a sense of civic responsibility and their awareness of community problems elevated. Farmers gained new knowledge and the service provided. The service gained could be translated into more profitable and sustainable farms. The Holstein consultant could also

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expand his customer base. More than 85% of students said they received a positive experience with service-learning projects and a positive experience working with farmers. The majority of students (95%) and all farmers recommend UMC continuing service-learning projects with local farmers. As stated by Raflo (2000), service-learning provides a potential bridge between community and academic interests. It may enable individual faculty members to fully integrate their research, teaching and service into their immediate community needs (Marullo, 1999). Service-learning could be a valuable teaching method for other agricultural courses.

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