

Engagement in Practice: Lessons Learned from a Two-Year Multidisciplinary Service-Learning Course

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Engagement in practice: Lessons learned from a two-year multidisciplinary service-learning course

Bringle and Hatcher [1] defined service-learning as a “course-based, credit bearing educational experience in which students (a) participate in an organized service activity that meets identified community needs, and (b) reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of personal values and civic responsibility” (p. 112). Service-learning has been adopted into higher education curricula for many of its proven benefits, including improved student civic engagement [2], [3], [4], [5], [6], [7], critical thinking [8], and interpersonal skills like communication skills [9], [10] and collaboration skills [11], [12], [13].

Based on this well-accepted definition, in spring of 2017, we designed and launched the Hunger-Free Texas service-learning project involving students from three different disciplines representing technology, people, and process at a university in Texas. Each Tuesday students learned discipline-specific technical content separately, and each Thursday they worked remotely with food pantries through distance technology to conduct a needs assessment centered around the food pantry’s capacity, social issue awareness, engagement, and outreach (Figure 1). Details of the course design and execution were described in [14]. We have utilized the same course structure for both spring 2017 and 2018.

Tuesday classes Separate class meetings, learn discipline-specific knowledge



Thursday classes Combined class meetings, work on service-learning project

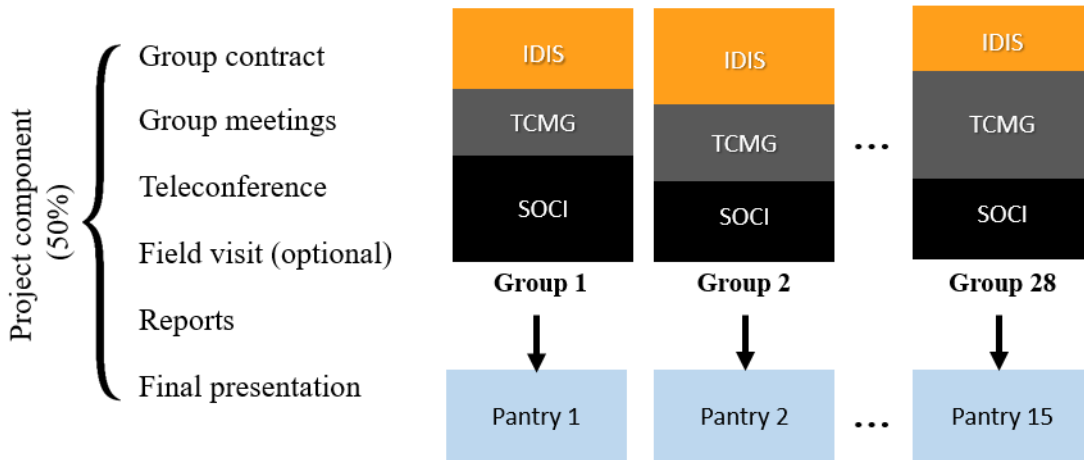


Figure 1. Service-learning course structure and team formation, spring 2017 [14].

In the pilot year, three disciplines collaborated to offer a service-learning course combining three child courses: IDIS 343-Industrial Logistics (Industrial Distribution, College of Engineering), SOCI 217-Introduction to Race & Ethnicity (Sociology, College of Liberal Arts), and TCMG 412-Contemporary Issues in Technology Management (Technology Management, College of Education and Human Development). In spring 2018, we had students from only two classes, IDIS 343 and SOCI 217, due to the instructor from the other department leaving the department after the pilot year. Over the past two years, we have engaged 207 students formed into 48 multidisciplinary groups, and 26 food pantries within 120 miles of our university campus. We had 15 food pantries as community partners for each project year. For the second project year, we welcomed four returning agencies from the first year and 11 new agencies (Figure 2). The participants for two project years are shown below.

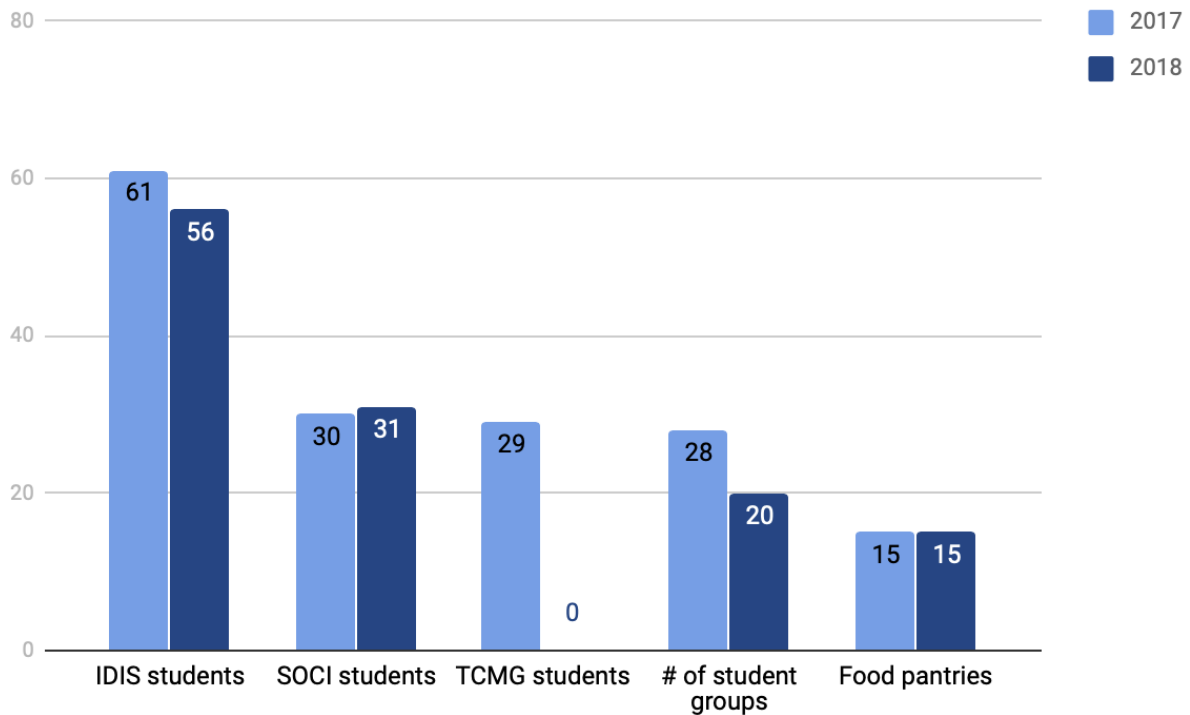


Figure 2. Project Hunger-free Texas participants summary, 2017-2018 semesters.

Each food pantry had a designated liaison who served as the contact person and project mentor to one or two groups of students, depending on the food pantry’s capacity. We designed each groups to consist of students from different academic majors and years in school, so that they could learn from each other’s expertise and have different viewpoints when looking at a problem. Student groups worked with their agency liaisons to gather information about the pantry, conducted research with the guidance of their faculty to “dig” for the root of the problem, and brainstormed together with their agency liaisons. Student groups held weekly or bi-weekly teleconferences with their agency liaison. Students solved problems with their technical knowledge learned from their own discipline and perspectives of other disciplines.

IDIS students took the lead when the organizational issues were more engineering-focused. For instance, one food pantry wanted to increase their warehouse operational efficiency,

and students proposed a new loading dock to reduce the time and manpower for unloading. For some projects, SOCI students took the lead, an example would be that a food pantry wanted develop an outreach/media campaign for the immigrant residents within their county, and the students proposed for the pantry to partner with local churches to renew immigrant population trust in the agency. No matter what focus the project had, students' solutions must incorporate knowledge and ideas in fields of industrial logistics, sociology, and technology. For instance, a food pantry wanted to improve the efficiency of their client check-in process, students suggested utilizing a new buzzer call system; however, after proposing the idea to the agency liaison, the food pantry could not financially afford a new system; in the end, the students proposed to redesign the old client check-in system to a lottery-raffle like system. Another food pantry wanted to utilize their storage space more efficiently, so the engineering students drafted a 3D blueprint to redesign the storage layout; during their discussion with their agency liaison, students realized that in order to make the change, funding would be a problem, so the group brainstormed and proposed a capital campaign to raise the fund for their solution. Through the multidisciplinary collaboration and communication with the community partners, students were pushed to design solutions that were ethical, technically sound, and financially feasible.

Research showed our pilot year project was a success in engaging students with satisfactory learning outcomes, but the project's open-ended problem structure caused some confusion among students. Students were not given a problem to solve; instead, they had to evaluate the information provided and assess the agency's needs. Other problems also included student complaints about unexpected workload, the need for an in-person visit to a food pantry, lack of formal agency feedback, etc. [14].

Based on the results, we made changes and improvements in the second-year project in the hope of improving students' experience. We used characteristics of effective service-learning [15] as guidelines for our second-year project, which was adapted from "five critical elements of thoughtful service" [16]. The five elements include (1) community voice, (2) application, (3) placement quality and diversity, (4) reflection, and (5) assessment. Table 1 shows the adjustments made to project structure and deliverables of the second project year based on the pilot year results and how these changes reflected characteristics of effective service-learning.

New component/improvement and explanation	Community voice	Application	Placement quality & diversity	Reflection	Assessment
Instructors visited agencies before project began to engage with agencies, explain rules, set expectations, brainstorm project ideas.	x				
Agencies provided pre-defined problems to reduce ambiguity	x				
Conducted survey to understand students' project preferences & skills to facilitate multidisciplinary team building			x	x	
Conducted quizzes (pre & post) to test students' knowledge gain in hunger issues				x	x
Student field trip to a food bank and food pantry to improve student-agency engagement and provide a learning opportunity	x				
Reinforced teleconference schedule to engage better with agencies & enhance communication	x		x		
Emphasized the importance of a high quality group contract and peer evaluation to improve students' efforts and team dynamics				x	x
Hosted awards & recognition ceremony to recognize & financially support impactful projects	x				x
Sent out a survey to learn agencies' project experience and student groups' performance	x				x

Table 1. Changes and improvement made to project in spring 2018 semester based on the adapted five critical elements of meaningful service.

Second-year project design & execution

We describe the changes made in the second project year and demonstrate the impact of these changes using quantitative and qualitative data collected from students' reflection assignments, course evaluations, and agency feedback surveys.

Improved project design and students' feedback

In the pilot year, students had complained about the unexpected workload, unclear course objectives, ambiguity caused by not having a pre-defined problem, and non-contributing team members. We made several changes in the project design in response. First of all, we changed from an open-ended "needs assessment" assignment to a problem pre-defined by the food pantry and the faculty. Students completed a project preference and skills survey so that their reported personal strengths and project preferences could be integrated into the group formation process, and made sure to have different academic levels and majors within each group. In the student recruitment phase, we included a course introduction video to help students visualize how this service-learning course would work so they knew what to expect before registering for the course. A welcome dinner event was hosted in the first week of the spring 2018 semester to clarify project deliverables and expectations, as well as emphasize the importance of *Group Contracts* and the importance of peer evaluation for their final grades.

By adding these elements, we were hoping to see better collaborative dynamics among the students and an improved overall course experience. Data collected from the spring 2018 semester proved positive results. For instance, in a reflection assignment that asked questions

about students' group-building experience, a majority of the students commented on the benefits of having a *Group Contract*:

"Yes, everything when [went] very smoothly. There were no conflicts, and even if there were, we had things to solve that in our contract. My group has been awesome." [quoted from an IDIS 343 student]

"The group contract creation went well. It allowed us to communicate early and often which has led to success as a group. There has not been any major conflict." [quoted from an IDIS 343 student]

Furthermore, 70 out of 79 (88.6%) of students reported that they did not have any conflict when creating the group contract. 28 out of 79 students recalled that there were some clauses that they wish they had included in the contract; most were in regards to the schedule, plan, and attendance of group meetings (13 responses), and specifications of individual expectations and assignments (11 responses). Many mentioned that the *Group Contract* had played an important role in the project, one student wrote:

"When our group created our group contract we through[thought] of every possible downfall in the group. We have had some issues come up, but we were able to solve them thanks to the contract."[quoted from a SOCI 217 student]

Course evaluations

The course evaluations also reflected an improved course experience. When asked, "Please add your overall thoughts on the course and instructor," some IDIS 343 students commented:

"Much more interesting than I anticipated. Well organized and well taught."

“I liked the information that I learned and the chance to work on a project that gave back to the community.”

“I thought the service learning project was a great idea. It was difficult to meet with my team members since we are in different majors, and have different schedules. Giving us time to work on our project during class was the best way to get our stuff done. Overall I am glad I joined the service learning group.”

“I really enjoyed the course. I can't emphasize enough how refreshing the real world experience was and how applicable the information has been. I felt like the information I was learning was immediately pertinent and useful. I have only one complaint with this class, which was how the groups were created. I have had no issues with my groups willingness to work together, however many of our schedules are locked, giving us very very limited time to meet. Majority of students are capable of putting aside opinions and frustrations to get a project done. I feel that would also be more realistic, as we are more likely to run into people we disagree with but that have the same schedule. Aside from the few working sessions, we had almost no times we could all meet simultaneously. This was a huge burden and stress factor throughout the semester. Overall a great class, but I highly recommend switching the personality quiz for a schedule quiz. If we can't meet we can't get the project done to the best of our abilities.”

Strengthened community partnership and engagement

Central Texas Food Bank (CTFB) has been our strategic partner since the project pilot year. They helped us to reach out to their in-network food pantries, recruited agency participants, and provided useful resources regarding food policies and regulations. In the second year, CTFB allocated funds (one \$10,000 and one \$5,000 prize) to allow food pantries to implement the

team’s solutions. Awards were based on the quality and potential impact of student project proposals. In order to be eligible for the prizes, pantry agencies agreed to: identify a reliable food pantry contact person, provide advice and timely feedback to students, and create teleconference schedules for regular contact with the group.

In the second year, the instructor team also visited food pantries to explain how the Hunger-free Texas project would work (see project timeline below), and held brainstorming sessions to help agency liaisons start their project ideas. Because of these additions, and the added stipulation that pantries identify a problem for students to work on ahead of time, we saw higher levels of student and agency motivation and engagement. With the monetary award at stake, we also saw an improvement in the quality of this year’s project proposals.

Project Phase	Initiatives taken	Location
Preparation	Agency recruitment by Central Texas Food Bank	Online
	Agency visits*: presentation, brainstorming	Selected food pantries
Early project	Welcome dinner* for students and agency liaisons	On-campus
	Student project preference & skills survey*	In-class
	Group formation: pairing students with designated agency liaisons	In-class
Mid-project	Mandatory field trip* to food bank and pantry	Selected food pantries
	Students weekly/bi-weekly teleconference with agency liaisons	Teleconference
End-project	Final presentations; project winners recognition ceremony*	On-campus, with pantries in attendance
After project	Collect agency’s formal feedback* on student group performance	Online

Table 2. Hunger-free Texas project timeline, spring 2018. * means new for spring 2018 semester.

On April 26th, 2018, students presented their final proposal and action plans addressing the problems identified by their food pantry liaisons. The judging team consisted of internal judges from Central Texas Food Bank and external judges from our university and local food

banks. Five prizes, including three monetary prizes and two honorary prizes were awarded to food pantries based on a rubric developed by the Food Bank and distributed to the students in advance. We later followed up with those agencies and some of them have already implemented the proposed solutions.

Agency feedback

Since no formal agency feedback was collected in the pilot year, we were not able to systematically evaluate students' project performance from the community partner's perspective. The second year, a survey was distributed following the final presentation event to the agency liaisons. Based on the survey results, most of the agency liaisons enjoyed working with their student groups. The positive feedback included: students were all involved; they made good efforts and had a good sense of purpose; students were respectful, professional, concise; some even visited the facilities in-person outside of class time; frequent communication; and staying on top of project. As one agency commented:

“The group was very dedicated to finding a realistic solution to the concern we were facing; it was obvious that they took the project very seriously and as a result developed an outstanding solution.”

At the meantime, the survey revealed some issues, including that some students did not send certain deliverables on time; students did not follow the conference call schedule or were late for the call; students waited until the last minute to ask vital questions.

Students learning outcomes

At the end of the pilot year interviews, students expressed the need for an in-person visit to food pantries. Because most of the food pantries were one- to two-hour drives away, there was

a disconnect between the students and their agency liaisons. To increase students' understanding of how food banks and food pantries work, we also added a mandatory field trip to Central Texas Food Bank (CTFB) and integrated more hunger-related topics into our lectures. To assess students' knowledge, we developed a quiz that consisted of questions regarding the status of hunger and food assistance programs. The quiz was conducted at the beginning of the semester and again towards the end of the semester. A paired t-test revealed that 79% of students scored significantly higher in the post-test than the pre-test, with a mean difference of 2.84 (sig. <.05, max. 15 points).

Paired Samples Statistics									
	Mean	N	Std. Dev.	Std. EM	Correlation		Paired t-test		
					Corr.	Sig.	t	df	Sig.
Pre-Hunger Quiz	8.48	81	3.78	.42					
Post-Hunger Quiz	11.32	81	3.19	.35	.522	.000	-7.414	80	.000

Table 3. Comparison of pre & post Hunger Quiz results.

In a reflection assignment occurred towards the end of the semester, we asked students if this project had increased knowledge about issues in the community. 72 (94%) of 76 participants answered yes, and said that they were more aware of hunger and its severity in the local community, and realized how fortunate they were. When asked if they thought the problem was an issue worth solving, only one student wrote “no,” and explained it was because their group was not able to implement their preferred solution, but rather had to implement the agency liaison’s preferred solution. We asked them “*Has this project increased your confidence in your ability to solve ill-defined problems that you might face in real life in the future?*” The answers included “No” (7%), “somewhat” (4%), and “yes” (87%), and their explanation was that they had learned something through the project, mainly focused on the approach of finding multiple solutions through critical and creative thinking, or brainstorming with different mindsets. Those

who did not think they gained confidence either believed they were already very confident in problem-solving, or the problem given to that group was not perceived as ill-defined (not applicable), or the students considered the project irrelevant to their future career. Here is an interesting quote from which we can see the “side-effect” of a group project:

“Somewhat, but it made me nervous since I tried to answer/give a problem but it kept getting shot down. Now I know as a group I have confidence to come up with a solution but individually I do not have confidence.” [quoted from a SOCI 217 student]

Working in a multidisciplinary team

Another focus of a reflection assignment was about the impact of multidisciplinary collaboration on learning. Students’ answers focused on: being more aware of diversity, being able to look at a problem from different perspectives, gaining professional skills, and an improved approach toward work relationships. Some students also said that they had made friends that otherwise they would not. In their own words:

“Working with people from different academic backgrounds always expands your own knowledge through all of the experience they bring from their studies. I learned some of the basic sociological principles surrounding the topic at hand, and would be able to apply these principles to other projects I may encounter.” [quoted from an IDIS 343 student]

“It provides a new approach to thinking. Having a sociology major changes how we approach certain things. For our project we are using this thought process to come up with the best solution.” [quoted from an IDIS 343 student]

“I feel as though working in multidisciplinary teams has positively impacted my learning experience. It has allowed me to work with group members of varying backgrounds/studies, and taught me how to work with others who are not pursuing the same degree as myself. It has

been a good experience seeing what each different group member has been able to 'bring to the table.'" [quoted from a SOCI 217 student]

Skills development and knowledge application

Students applied the technical knowledge they learned in their own discipline into the service-learning project. For the engineering students, many of the food pantry issues needed to be solved were within the engineering field: for instance, inventory, transportation, and facility location issues, which are all topics covered in IDIS 343 course (Distribution Logistics). SOCI 217 students took a leading role when the food pantry needed to develop or expand their outreach programs or educational workshops, and TCMG 412 students contributed their wisdom when technological applications such as application or web design were needed.

Results from the reflection assignment that asked the multidisciplinary project's impact on professional skills (communication, collaboration skills, etc.) show that over 85% of the 70 participants indicated that they had either developed new skills or improved existing skills throughout this project. These skills included communication, critical/creative thinking, taking initiative, teamwork, cultural awareness, and professional etiquette. Here are some quotes from students' answers:

[Communication and collaboration] "I improved my communication skills and my ability to work with partners vastly by working on this project. We talked to a representative from the pantry at least once a week and had to talk with the foundation as well to see the guidelines for a capital campaign. We as a group have had to constantly talk and share ideas, as well as plan our schedules and meetings." [quoted from an IDIS 343 student]

[Cultural awareness] “I believe that the skill I improved on most was Global and Cultural awareness. I really had no idea how a food pantry worked and had no clue how many people are actually effected by hunger.” [quoted from a SOCI 217 student]

[Critical thinking and civic literacy] “I developed my critical thinking skills and civic literacy and citizenship by working on this project. I typically preferred working alone when it comes to projects and assignments, however by being put into a team I was exposed to different ways of thinking. My team members showed me multiple approaches to the issue that I would have never thought on my own. They were able to stimulate my critical thinking and helped me to have a wider point of view and be open to more ideas. Not only did I improve my critical thinking, I definitely worked on my civic literacy and citizenship skills. None of the projects I've worked on before has helped me to be this connected to the community and make such an impact. Being able to see the fruits of our efforts is very satisfying because can see how effective our solutions are and actually be able to implement them.” [quoted from an IDIS 343 student]

Perceived project impact on students

We utilized reflection assignments to measure students’ perception of their project impact. We measured their perceived community, personal, and professional impact. Mid-project reflection and late-project reflection assignments examined students’ perceived project impact in a pre-test and post-test fashion. We compared students’ perceptions by computing the difference between the two answers by the same students. The majority of the students had a steady or increased perceived impact: 36% decreased, 24% increased, 40% unchanged in perceived *community* impact, 39% decreased, 31% increased, 30% unchanged in perceived *personal*

impact, and 46% decreased, 23% increased, 31% unchanged in perceived *professional* impact (n = 72).

Perception change	Change in perceived community impact		Change in perceived personal impact		Change in perceived professional impact	
	Frequency	%	Frequency	%	Frequency	%
-3	1	1	2	3	1	1
-2	7	10	9	13	10	14
-1	18	25	17	24	21	30
0 (no change)	29	40	22	31	22	31
+1	14	19	19	26	12	17
+2	3	4	3	4	4	6
Total	72	100	72	100	70* ¹	100

Table 4. Changes in students' perceived project impact during spring 2018 semester.

Lessons learned from the two-year multidisciplinary service-learning project

The Agency Feedback Survey reflected positive student engagement with their agency liaisons and project, and the problems identified provided insight for our future project planning and will be shared with future students to avoid making the same mistakes.

As the project proceeded and their understanding of the project scope deepened, students' perceived project impact had overall decreased during the semester. In other words, they might have started with bigger ambition but realized their expectation was a little high. Thus, in the future, we should set practical expectations at the beginning of the semester so that the students will not experience frustration or disappointment.

Although the monetary prize played an important role in encouraging agency participation, and it enabled winning food pantries to implement the proposed solutions, the fixed funding amount demotivated some students and their agency liaisons. Through

¹ Two students did not complete the corresponding questions among the 72 participants.

conversations with a few agencies and students, they mentioned that the chance of them winning the funds was small because their project did not require a budget as large as \$10,000 or \$5,000. Furthermore, it appears that some students put more weight on winning for their food pantry, instead of learning and making an actual impact in the community. In the third year project, we have discussed this with the Central Texas Food Bank in order to solve this issue of “losing the focus.” The project will be evaluated in the third year based on their cost-efficiency, affordability, feasibility, level of impact, and creativity (bonus points), however, the funding *amount* for the winners will be based on the actual proposed budget instead of having first- and second-place winners with fixed award amounts. Projects that are cost-effective will have a greater chance of winning under this model.

Conclusions and next steps

In conclusion, we are confident that the second-year project was successful in terms of its influence on students’ civic learning and engagement, as well as our strengthened and expanded partnership with emergency food providers in the local communities. Through their participation in this multidisciplinary service-learning project, our students gained more knowledge and skills, learned to view and solve problems from a different perspective. We are rolling out our third-year project and making continuous improvements.

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