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# Looking beyond the Undergraduate Classroom: Factors Influencing Service Learning's Effectiveness at Improving Graduate Students' Professional Skills

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## Looking Beyond the Undergraduate Classroom

**Abstract:** This study provides a greater understanding of which factors influence the effectiveness of service learning projects at improving graduate students' professional skills. Data for this study was gathered from students in eight Master of Public Administration (MPA) courses taught during two semesters at a large state university. Younger students were more likely to believe that their service learning project was helpful in improving their professional skills compared to older students. We also find that students who spent more time working on a service learning project outside of class reported their projects were more helpful at improving their professional skills. In addition, our ANOVA analysis indicates that for projects involving group activities students who were members of groups that worked as teams reported that their projects were more helpful at improving their professional skills than students in less cohesive groups.

### Introduction

A variety of professional graduate programs use service learning. There are examples in the fields of public administration (Bushouse and Morrison 2001; Dicke, Dowden, and Torres 2004; Lambright and Lu 2009; Reinke 2003), social work (Rocha 2000; Wells 2006), nursing (Beck et al. 2004), physical therapy (Reynolds 2005; Beling 2004), public health (Gregorio, DeChello, and Segal 2008), and occupational therapy (Beck and Barnes 2007). According to Barbara Jacoby (1996), "service learning is a form of experiential education in which students engage in activities that address human and community needs together with structured opportunities intentionally designed to promote student learning and development (p. 5)." This pedagogical tool, which allows students to apply course knowledge in the real world with benefits for both students and community members (Simons and Cleary 2006), may be particularly well-suited for professional graduate programs. Adults learn new knowledge and skills best

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when they relate it to their life experience (Whitaker and Berner 2004). Despite widespread use of service learning in professional graduate programs, most service learning research has focused on undergraduates and secondary students.

Service learning helps students develop valuable professional skills (Bennett, Henson, and Drane 2003; Conrad and Hedin 1982; Eyler and Giles 1999; Moely et al. 2002; Sax and Astin 1997; Simons and Cleary 2006). This study investigates which factors influence the effectiveness of service learning projects at improving professional skills. We define professional skills as interpersonal skills, problem-solving ability, oral and written communication, and leadership skills.<sup>1</sup> Our study examines the impact of the following project and student characteristics: instructor guidance, reflection time, project time, student influence, contact with beneficiaries, use of group work, group dynamics, gender, race, age, volunteer and work experience, past and concurrent involvement in service learning and status as a full-time student.

The limited research on this topic has focused on undergraduate and secondary students. In contrast, this study is based on data collected from students in Master of Public Administration (MPA) courses at a large state university. It explores whether past research findings also apply in graduate school settings. Graduate students have more work and life experience than secondary students and most undergraduates. As a result, the characteristics that make service learning effective for graduate students may be different.

Factors Influencing Service Learning's Effectiveness

Several project characteristics may influence service learning's effectiveness. Instructors can play a key role in service learning. Instructors who provide more guidance may be more effective in reinforcing the professional skills students are learning. By providing reflection opportunities, instructors facilitate students processing their values and goals (Hatcher, Bringle, and Muthiah 2004) and moving beyond individual experiences to consider broader implications of their service (Parker-Gwin and Mabry 1998).

Other project characteristics may impact service learning outcomes. Student ownership and leadership in service learning help to authenticate their experiences and make it significant to students (Morgan and Streb 2001). As a result, projects in which students have greater influence may be more effective. In addition, student contact with service beneficiaries may have a positive impact by exposing students to a greater diversity of perspectives and by offering students the opportunity to learn effective ways for communicating with different audiences (Barron et al. 1998). Students who work on service learning projects with other students may benefit more than students who work alone for these same reasons. On the other hand, group dynamic problems may distract students and prevent them from maximizing service learning benefits. Students required to participate in service learning may also benefit less if they resent the compulsory nature of their experience. As a final project characteristic, service learning

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projects that require more time may result in more meaningful experiences and greater benefits.

Student characteristics may also influence how effective a particular service learning project is at improving a student's professional skills.

Demographic factors impact a wide variety of student experiences and may influence the benefits students receive from service learning (Warren 1998). Age may be particularly important in graduate school because the age range tends to be much larger than at the undergraduate level.

Other student characteristics that may be important in determining service learning outcomes include involvement with volunteer activities and work experience. Students with volunteer and work experience may benefit more because their past experiences may make them more comfortable with service learning. Alternatively, service learning may be less effective because these students may have already had opportunities to develop professional skills in other types of settings. A student's past experience with service learning may also reinforce lessons learned from service learning in another context, resulting in greater benefits for students. On the other hand, students with considerable service learning experience may benefit less if they feel "burned-out" due to the labor and time intensive nature of service learning. Finally, full-time graduate students may gain more because they tend to have fewer commitments outside of

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the classroom and may be able to devote more time to service learning than part-time students.

Empirical research on factors influencing the effectiveness of service learning projects at improving professional skills is very limited. Based on data collected from primarily undergraduates, Eyster and Giles (1999) find: (1) reflection activities were positively associated with problem-solving ability; (2) female service learners were more likely than male service learners to believe service learning had improved their communication skills and ability to work with others; (3) older students were more likely to believe service learning had improved their leadership skills, and (4) students with other volunteer service were more likely to believe service learning had improved their ability to work with others. In another important study, Conrad and Hedin (1982) investigate the impact of experiential education on secondary students' development of problem-solving skills. According to their findings, programs that had in-class reflection, lasted at least a semester and were more time-intensive improved student outcomes. Adult guidance and student autonomy also had a positive impact on outcomes.

### Research Methodology

Data was collected from seven MPA courses taught during the Spring 2007 semester and one MPA course taught during the Fall 2007 semester. Service learning projects were conducted as part of each of the eight courses. In

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five courses, all students worked on the same service learning project. In the other courses, students worked on different service learning projects. Table 1 briefly describes the service learning projects.

<Table 1 about here>

At the end of the semesters, students enrolled in each course were asked to complete a brief survey about their service learning project. Some students were enrolled in more than one of these courses. These students were asked to complete a separate survey for each service learning project in which they had participated. The surveys were completed during classroom time. The survey administrator and instructor left the classroom while students completed the survey in order to protect the anonymity of students participating in the study. We received 95 usable surveys from the 111 students enrolled in these classes, representing a response rate of 86%. The figure indicating that 111 students were enrolled in the classes we collected data from counts some students more than once because these students were taking multiple service learning classes. Thus, each survey represents one student's experience with service learning in a specific course.

The student survey can be found in Appendix 1 and includes both open- and closed-ended questions. In the open-ended question section, students were asked to describe their service learning project and to suggest ways it could be improved. As part of the close-ended questions, students were asked to rate how

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effective the service learning project was at helping them achieve fifteen different outcomes. For these questions, students used a scale of 1 to 5 to rate how helpful the service learning project was at achieving each outcome with a 1 indicating that the project was not helpful and with a 5 indicating that the project was extremely helpful. In addition, the survey asked several close-ended questions about the structure of the service learning project. Topics covered included questions regarding instructor guidance, in-class time for reflection, the amount of time spent on the project outside of class, their influence over the direction of the project, and whether the project involved group activities. If students had participated in group activities, they were asked to assess how well their groups had worked as teams. Finally, the students were asked a series of questions about their background including their gender, race, age, volunteer experience, past involvement with service learning, concurrent involvement in other service learning projects, work experience, and status as a full-time student.

Course instructors were also asked to complete a brief survey about their service learning project. This survey can be found in Appendix 2 and focused on project characteristics. Like the students, instructors were asked to describe the service learning project. In addition, they were asked close-ended questions about the number of different service learning projects that were conducted as part of the course, the level of contact students had with service beneficiaries, who selected the topic of the service learning project, and whether the major activities



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and graded assignments involved group and/or individual work. If the project involved group work, the instructors were asked who determined group composition. Finally, instructors were asked if the class was a required or an elective course in the MPA program.

We used student responses regarding the helpfulness of service learning projects at achieving fifteen different outcomes to create the dependent variable for this analysis. Based on these fifteen items on the student survey, we conducted a factor analysis and identified three different sets of outcomes: (1) achievement of learning objectives, (2) civic engagement, and (3) improvement of professional skills. Since professional skills are the subject of this study, we then created an index score using the factor score of the five professional skill outcomes only: (1) ability to work with people more effectively, (2) improved problem solving skills, (3) improved oral communication skills, (4) improved written communication skills, and (5) development of leadership skills. The scale reliability coefficient for the professional skills index is 0.90. Descriptive statistics for the professional skills index score and its components are included in Table 2. Our survey data was analyzed using both ANOVA and multiple regression.<sup>2</sup>

### Findings

Tables 3 and 4 present our ANOVA analysis. According to Table 3, students participating in service learning projects that involved more in-class

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reflection time, more work outside of the classroom, greater student influence over project progress, and greater contact with service beneficiaries reported that their projects were more helpful at improving their professional skills. These findings suggest that providing multiple points of engagement for students in service learning projects can enhance their professional skills. On the other hand, students who participated in a group service learning project indicated that their projects were less helpful at improving their professional skills compared to students who participated in individual service learning projects. While working on service learning projects in groups appears to be associated with negative outcomes, there is also evidence suggesting that group work can be beneficial under certain circumstances and that group dynamics may be important. Students who were members of groups that worked as teams reported that their projects were more helpful at improving their professional skills.

<Table 3 about here>

Table 4 details the extent to which students with different characteristics believe their service learning projects helped them improve their professional skills. Based on our ANOVA analysis, younger students reported that their service learning projects were more helpful at improving their professional skills than older students. We also find that students involved with concurrent service learning projects reported that their projects were more helpful in improving their skills than students involved in a single service learning project. This implies that

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professional skills learned in one service learning project have the potential to reinforce skills that students are learning in another context. There were no significant differences in the professional skills index scores based on any of the other student characteristics we examined.

<Table 4 about here>

In Table 5, we present our regression analysis. Overall, our model explains 37 percent of the variation in our professional skills index. Consistent with our ANOVA analysis, we find that the time invested in the project outside the class is positively associated with perceived improvement of professional skills. In addition, age is negatively related to our professional skills index, indicating that younger students were more likely to believe that their service learning project was helpful in improving their professional skills compared to older students. Even though our ANOVA analysis suggests there are significant differences in the professional skills index scores of students depending on how well students believed their group acted like a team, we did not use this variable in our regression analysis. Including this variable would have reduced our sample size considerably because many of the students did not work in groups. Due to our small sample, we omitted this variable in order to keep as many observations as possible.

<Table 5 about here>

Discussion and Conclusion

This article examines the factors that influence the effectiveness of service learning projects at improving graduate students' professional skills. Key findings include that the amount of time students spent working on a service learning project outside of class and student age have a significant impact on perceived improvement of professional skills. In addition, our ANOVA analysis indicates that for projects involving group activities there were significant differences in the professional skills index scores depending on how well students believed their group acted as teams. Finally, there is some evidence suggesting that more in-class reflection time, greater student influence over project progress, and greater contact with service beneficiaries may improve the professional skills of graduate students participating in service learning. Our findings have a number of important implications for service learning instructors, particularly for those who teach graduate school students.

The amount of time students spend outside the classroom working on service learning projects matters. Service learning can be time intensive for both faculty and students (Banerjee and Hausafus 2007; Kendrick 1996). But rather than viewing time intensity as a negative aspect of service learning, our findings suggest service learning projects that are more time intensive are more effective than projects requiring less time. Spending more time outside the classroom appears to provide students with greater opportunity to develop their professional

skills. Similarly, Conrad and Hedin (1982) find that experiential education programs that were more time-intensive improved student outcomes. This suggests that instructors who want to use service learning to improve their students' professional skills should be encouraged to find projects that involve a significant amount of meaningful work outside of the classroom.

Group dynamics in service learning projects are also important. Among the students in our sample who worked in groups, those who believed their groups worked more like teams felt service learning was more helpful at improving their professional skills than students in less cohesive groups. Instructors who decide to have students work in groups as part of their service learning experience should devote attention to team-building exercises. Students should be encouraged to agree to group ground rules and a process for enforcing these ground rules. In addition, students should discuss how responsibilities will be assigned and how group problems will be resolved. If an instructor is familiar with the students, she might also encourage students to form groups in ways that minimize the likelihood of personality conflicts. Considering these issues in advance of the service learning project may help groups to function better.

Age is another key factor influencing the effectiveness of service learning projects at improving graduate students' professional skills. Younger graduate students appear to benefit more from this pedagogical tool than older graduate students. Our results suggest that service learning could be an alternative to the

traditional internship for helping younger graduate students develop their professional skills. The finding that younger students believed service learning improved their professional skills more than older students did is not particularly surprising given that older students likely have had more opportunities to develop their professional skills in other contexts. However, it does contrast research by Eyler and Giles (1999) who found older students were more likely to believe service learning had improved their leadership skills. Unlike this study, Eyler and Giles's research focused primarily on undergraduates. The fact that the age range of students is much wider in graduate school and that undergraduates typically have limited work experience are possible reasons for the difference between this study and Eyler and Giles's work.

Based on our ANOVA analysis only, we also find significant differences in the professional skills index scores based on: (1) the amount of in-class reflection time, (2) the level of student influence over the project, (3) the level of contact with service beneficiaries, (4) involvement in group activities, and (5) involvement with concurrent service learning projects. However, once we controlled for other variables, none of these variables were significant in our regression analysis. There are two ways to interpret this finding. It is possible that these factors do not influence the effectiveness of service learning projects at improving graduate students' professional skills when other factors such as age and time spent on service learning outside the classroom are taken into account.

On the other hand, it is possible that our regression model may not have sufficient statistical power to detect some significant relationships given our modest sample size. Replications of this study in other settings would be helpful in determining which interpretation is correct.

Among the student characteristics we examined, there is only evidence suggesting that age and involvement in concurrent service learning projects may affect the development of professional skills. Moreover, involvement in concurrent service learning projects was only significant in our ANOVA analysis. This suggests that student characteristics for the most part do not impact the benefits students received by participating in service learning and that service learning can be successfully used with diverse student bodies.

Finally, this study has important implications for future service learning research. More research is needed on the factors that influence the effectiveness of service learning projects at improving professional skills. One of our key findings was that for projects involving group activities students who were members of groups that worked as teams reported that their projects were more helpful at improving their professional skills than students in less cohesive groups. However, our survey did not ask students to elaborate on what “working as a team” involves. Further research on this topic would be particularly helpful.

This study’s sample was limited to students taking MPA classes at one university. The factors that influence the effectiveness of service learning at

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improving professional skills may vary for different types of graduate school programs. More research should examine the most effective service learning practices for graduate students in general. Our findings with respect to age are not consistent with prior research, suggesting that at least some of the dynamics of service learning in graduate classrooms are not the same as dynamics in other types of classrooms. By recognizing the unique context of service learning in graduate school, future research can help instructors in these settings maximize the effectiveness of this pedagogical tool.

In conclusion, the potential of service learning as a dynamic pedagogical tool is exciting while the task of using it effectively is challenging. Providing students with hands-on learning experiences that help them develop their interpersonal and communication skills is an important component of many professional graduate programs. Service learning represents a promising strategy for achieving these goals.

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### NOTES

<sup>1</sup> While we did not focus on this in our research, an understanding of professional ethics is also an important professional skill.

<sup>2</sup> If a reader wishes to know more about the estimations and their significance, the reader can email [ylu@jjay.cuny.edu](mailto:ylu@jjay.cuny.edu), and the authors will send the reader an attachment with the details.



**Table 1. Description of Service Learning Projects**

<b>Course</b>	<b>Description of Service Learning Project</b>	<b>Number of Service Learning Projects</b>
Administrative Law (1 section, Spring 2007 semester)	Students researched the legal aspects of intermunicipal services arrangements, focusing on New York.	One project
Capstone Seminar (1 section, Spring 2007 semester)	Students researched and analyzed an organization problem and made recommendations to address it.	Multiple projects
Evaluation (1 section, Spring 2007 semester)	Students designed an evaluation plan for a university scholarship program.	One project
Logic of Inquiry (1 section, Spring 2007 semester)	Students conducted a survey and analyzed the data from the survey for the local public transportation agency.	One project
Logic of Inquiry (2 sections, Fall 2007 semester)	Students conducted a survey and analyzed the data from the survey for the city police department.	One project
Proposal Preparation/Grant Management (1 section, Spring 2007 semester)	Students wrote grant proposals for local community groups.	Multiple projects
Public Management/Public Administration (1 section, Spring 2007 semester)	Students conducted assessments of a university public information technology system and prepared requests for proposals based on those assessments.	One project
Public and Non-Profit Finance (2 sections, Spring 2007 semester)	Students examined the feasibility of consolidating four service areas for a local county government.	Multiple projects

**Table 2: Descriptive Statistics for the Professional Skills Index Score and its Components**

Variable	Obs	Mean	Std. Dev.	Min	Max
Ability To Work With People More Effectively	101	3.64	1.01	1	5
Improved Problem Solving Skills	101	3.81	0.94	1	5
Improved Oral Communication Skills	102	3.53	1.10	1	5
Improved Written Communication Skills	102	3.78	1.00	1	5
Development Of Leadership Skills	102	3.59	1.06	1	5
Index of Professional Skills (Factor Score)	95	-3.35E-10	1.01	-3.96	1.64

**Table 3: The Impact of Project Characteristics on Professional Skills**

<b>Project Characteristics</b>	<b>Professional Skill Effectiveness Index Score</b>			<b>ANOVA Significance (Prob&gt;F)</b>
	Mean	Std. Dev.	# of Observations	
<b>Instructor Guidance on this Project</b>				
A little guidance	-0.04	1.26	9	0.60
Some guidance	-0.15	0.82	30	
A great deal of guidance	0.08	1.06	56	
<b>In-Class Reflection Time</b>				
A little time	-0.16	0.94	15	0.07*
Some time	-0.18	0.87	48	
A great deal of time	0.34	1.17	31	
<b>Hours per Week Spent Working on the Project Outside of Class</b>				
Less than 2 hours	-1.48	1.20	8	0.00***
2-5 hours	-0.10	0.83	38	
More than 5 hours	0.32	0.88	47	
<b>Student Influence over Project</b>				
A little influence	-0.91	0.93	10	0.01***
Some influence	0.04	0.85	41	
A great deal of influence	0.17	1.07	44	
<b>Project Involved Group Activities</b>				
No	0.47	0.89	23	0.01***
Yes	-0.15	1.00	72	
<b>Extent to which Group Members Work as a Team</b>				
Not at all like a team	-1.30	1.94	5	0.01***
Somewhat like a team	-0.37	0.79	24	
Very much like a team	0.09	0.87	42	
<b>Student Contact with Service Beneficiaries</b>				
A little contact	-0.09	1.02	62	0.00***
Some contact	-0.19	0.92	22	
A great deal of contact	0.91	0.59	11	

Note: \*\*\*<=0.01 level, \*\*<=0.05 level, \*<=0.1 level.

**Table 4. The Impact of Student Characteristics on Professional Skills**

<b>Student Characteristics</b>	<b>As % of total number of students</b>	<b>Professional Skills Effectiveness Index Score</b>
<b>Gender</b>		
Male	33%	0.00
Female	67%	-0.04
<b>Age</b>		
Twenties	57%	0.20*
Thirties	22%	-0.40*
Forties	21%	-0.02*
<b>Race</b>		
Non-White	22%	0.27
White	78%	-0.10
<b>Involvement in Volunteer Activities</b>		
Not at all involved	18%	-0.14
Somewhat involved	52%	0.04
Very involved	30%	0.02
<b>Concurrent Service Learning Projects</b>		
No	53%	-0.23**
Yes	47%	0.25**
<b>Do Concurrent Service Learning Projects Help Each Other?</b>		
Not at all	32%	-0.09***
Somewhat	41%	0.07***
A Great Deal	27%	0.87***
<b>Number of Prior Service Learning Projects Participated in</b>		
None	40%	-0.20
1-3 projects	34%	-0.02
More than 3 projects	25%	0.36
<b>Public/Non-Profit Work Experience</b>		
None	41%	-0.07
3 years or less	27%	0.23
4 years or more	33%	-0.09
<b>Full Time Graduate Student Status</b>		
No	34%	-0.18
Yes	66%	0.08

**Note:** \*\*\* $\leq 0.01$  level, \*\* $\leq 0.05$  level, \* $\leq 0.1$  level.

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**Table 5: Factors Influencing the Development of Professional Skills**

Dependent Variable=Professional Skills Index Score			
Independent Variables	Coefficient	Std. Err.	P> t
Project Characteristics			
In-Class Reflection Time	0.22	0.14	0.127
Hours Per Week Spent Working on the Project Outside of Class	0.73	0.15	0.000***
Student Influence Over Project	0.24	0.15	0.115
Project Involved Group Activities (Yes=1)	-0.25	0.33	0.454
Student Contact with Service Beneficiaries	-0.14	0.21	0.500
Student Characteristics			
Age	-0.29	0.12	0.014**
Concurrent Service Learning Project (1=Yes)	0.21	0.19	0.279
_cons	-2.00	0.73	0.008***
Number of obs		88	
Prob>F		0.000	
R squared		0.373	
Adjusted R-squared		0.318	

**Note: \*\*\*<=0.01 level, \*\*<=0.05 level, \*<=0.1 level.**

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## Appendix 1: Student Survey

Course Number and Name: \_\_\_\_\_

Section Number: \_\_\_\_\_

1) Describe the service learning project for this course in two to three sentences.

2) On a scale of 1 to 5, please rate how helpful the service learning project in this course was at achieving the following goals:

1 = project was not helpful  5 = project was extremely helpful

master material covered in this course	1	2	3	4	5
tie together concepts covered in this course	1	2	3	4	5
apply concepts covered in this course to real situations	1	2	3	4	5
develop a deeper understanding of material covered in this course	1	2	3	4	5
develop a deeper understanding of material outside of this course that is relevant in your graduate program	1	2	3	4	5
develop a better understanding of the role of public/nonprofit administrators	1	2	3	4	5
increase my enthusiasm for a career in public/nonprofit administration	1	2	3	4	5
learn to work with people more effectively	1	2	3	4	5
improve my problem-solving skills	1	2	3	4	5
improve my oral communication skills	1	2	3	4	5
improve my written communication skills	1	2	3	4	5
develop my leadership skills	1	2	3	4	5
feel more connected to my community	1	2	3	4	5
develop a deeper understanding of the complex problems facing my community	1	2	3	4	5
become more involved in volunteer activities	1	2	3	4	5

3) How could this service learning project be improved?



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- 4) How much guidance did the instructor provide on this project?
- a little guidance  
 some guidance  
 a great deal of guidance
- 5) How integrated was this project into the material covered in this course?
- not at all integrated  
 somewhat integrated  
 very well integrated
- 6) How much time in class was spent discussing this project?
- a little time  
 some time  
 a great deal of time
- 7) On average, how many hours per week did you spend working on this project outside of class?
- less than 2  2-5  more than 5
- 8) How much influence did you have over how this project progressed?
- a little influence  
 some influence  
 a great deal of influence
- 9) Are you currently participating in a major service learning project for another class you are taking this semester?
- yes  no
- 10) If you answered yes to question #9, how much has the work you have done on the service learning project in this class helped you with the service learning project for the other class?
- not at all  
 somewhat  
 a great deal

Only answer questions 11 and 12 if you participated in group activities as part of the service learning project for this course.

- 11) How many members were in your group?  
\_\_\_\_\_
- 12) How well did your group work as a team?
- not at all like a team  
 somewhat like a team  
 very much like a team

### Background Information

- 13) Gender:  male  female
- 14) Age:  21-29  30-39  
 40-49  50 or older
- 15) Race/Ethnicity\_\_\_\_\_
- 16) Are you a domestic or international student?
- domestic  international
- 17) What was your undergraduate major?  
\_\_\_\_\_
- 18) What is your graduate student status?
- full-time  part-time
- 19) How many years of public and/or non-profit administration paid work experience do you have?
- None  3 years or less  
 4-5 years  More than 5 years
- 20) Prior to this semester, how involved were you in volunteer activities?
- not at all involved  
 somewhat involved  
 very involved
- 21) Prior to this semester, how many major service learning projects had you participated in as an undergraduate and/or graduate school student?
- 0  1  2  3  more than 3

## Looking Beyond the Undergraduate Classroom

### Appendix 2: Instructor Survey

Course Name: \_\_\_\_\_

1) Briefly describe the major service learning project(s) conducted as part of this course in two to three sentences.

2) How many major service learning projects were conducted as part of this course this semester?

one  more than one

3) Who selected the topic of the project that students participated in?

the course instructor selected the topic

students selected the topic

students selected one topic from a set of topics pre-selected by the course instructor

other: \_\_\_\_\_

4) Did the major activities for this project involve group and/or individual work?

individual work only  group work only  individual and group work

5) Did the major graded assignments for this project involve group and/or individual work?

individual work only  group work only  individual and group work

6) Both graded and un-graded activities should be considered for this question. If this project involved group work, who selected the groups that students participated in? Please check all that apply.

students selected the groups

the course instructor selected the groups

no selection (the entire class worked as a group)

n/a (there was no group work)

7) Did guest speakers come to class to discuss the project?

yes  no

8) Was this course required or an elective?

required  elective