Benefits of Service-Learning (S-L) and Student Development in Science Fields

by

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ABSTRACT

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Current literature describes the many benefits to integrating service-learning into the college classroom. All literature reviewed stated there is a clear difference between students volunteering their time to community issues and service-learning integration. This study was based on seven developmental aspects resulting from service-learning literature: social and civic responsibility, intellectual development, leadership development, cross cultural development, moral and ethical development, career development, and personal development.

Participants were split into two groups: one that was involved with service-learning and one that volunteered. The study involved taking a survey and participating

in preview and reflection discussions to measure the development in a service-learning class as opposed to another class involved in strictly volunteering. The study resulted in small clear developmental patterns suggesting reasons for implementation of service-learning in more classrooms.

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Chapter I: Introduction

Introduction

As you trek across the street or walkway to each class day in and day out, are you

thinking about the opportunities you will encounter in your learning endeavors? Not every

student is going to get the experience in the community addressing community needs as part of

their course work. Service-Learning (S-L) in the classroom is being practiced, but only

minimally with instructors. Instructors and students could misconstrue S-L for volunteering for

class credit. This misconception can be overlooking the benefits that students are going to see

through S-L and the additional components of S-L as opposed to volunteer work. When

volunteering, the students are developing their social responsibility through donating their time

to the community. S-L will enable the students to address a community need through service, but

they will, additionally, get the opportunity to reflect on the activity in order to gain further

knowledge of the course content and the population served.

Volunteering in the community can be beneficial to the students and the receiving

citizens, but through S-L, students, instructors and the community are going to develop in

multiple ways more than they would through volunteering. In order for instructors to make the

transition to implementing and incorporating S-L in their curriculum, there needs to be a reason.

Looking at the difference between volunteering and S-L is going to move the instructors forward

to teaching quality classes, giving the students opportunities to enjoy learning and to develop

different aspects of their life and college career.

S-L currently is not institutionalized at the University of Wisconsin – Stout (UW-Stout).

Very few instructors know what S-L is and what it entails. The benefits to the students, their

learning outcomes and their development resulting from S-L are not marketed to the instructors

as possibilities in their course implementation. It is perceived that more instructors and administrators need the research on how S-L is affecting the development of the students and their learning. Research on the positive impacts on student learning could be the factor in which would aid the institutionalization of S-L. Not only can the impacts of the students' learning be researched through this problem, but the impact on the community can be realized and valued through S-L and research.

Problem Statement

The problem of this study is to analyze the difference in the skill/student development between volunteerism and formal S-L activities within biology classes in higher education.

Purpose of the Study

The purpose of the study is to implement S-L activities and discussions into the classroom of the participating instructor and collect data reflecting the possible developments and benefits resulting in the implementation. The intention to review current literature and analyze other S-L activities to evaluate the developmental outcomes of S-L is to validate the data collected in the study. This review and evaluation will give the researcher and other instructors an idea of the importance of S-L as opposed to volunteering. A general overview of the impact of S-L in the classroom is the intent of this study; to begin the awareness of the importance of possible institutionalization among institutions. This study will compare and contrast volunteerism and S-L in different sessions, but the same class.

Through conversations with those who are integrating S-L in the classroom, there has been a trend of satisfaction of the learning outcomes and satisfaction of the course. The instructors are interested in student development through service to certain community

populations with needs related to the course work. Students participating in these classes have showed development in certain areas that pertain to their college and future professional careers. By researching students in S-L activities and those that simply volunteer for their courses, instructors can use the results to decide upon integrating S-L in their classrooms.

After reviewing literature on S-L and the benefits of integrating it in the classroom, there will be a general resource model for instructors to follow in order to start the S-L integration in their curriculum. Beginning instructors will not only have the basic knowledge of S-L, but the resources to practice the instruction and integration. It is a goal that the instructors and administration will see a need of S-L in the classroom more than it is practiced at this time. Another goal is for the institution to see the need for S-L and entertain the idea of institutionalizing S-L in various classrooms and maybe across some colleges.

Assumptions of the Study

When surveying the students, whether in the classes using S-L or volunteer efforts, answers to the questions could have the potential to be based on their entire college experience. It would be safe to assume that the results are going to be dependent on the nature of the S-L activities administered by the instructors. It is an assumption that the students that strictly volunteer their time to the community for class credit are going to show less development in the stated areas as contrasted to the students participating in formal S-L activities for class credit.

Definition of Terms

> *Career development.* "The total constellation of psychological, sociological, educational, physical, economic, and chance factors that combine to influence the nature and significance of work in the total lifespan of any given individual" (National Career Development Association, 2005, para 3).

Civic engagement. "Individual and collective actions designed to identify and address issues of public concern. Civic engagement can take many forms, from individual voluntarism to organizational involvement to electoral participation. It can include efforts to directly address an issue, work with others in a community to solve a problem or interact with the institutions of representative democracy" (Carpini, n. d., para. 2).

Community service. "Services which are identified by an institution of higher education, through formal or informal consultation with local nonprofit, governmental, and community-based organizations, as designed to improve the quality of life for community residents, particularly low-income individuals, or to solve particular problems related to their needs" ("Definition of Community Service," n. d., para.1).

Ethical. "Conforming to accepted standards of social or professional behavior (para 1). Adhering to ethical and moral principles; 'it seems ethical and right'; 'followed the only honorable course of action'; 'had the moral courage to stand alone'" (Word Reference (a), n. d., para 2).

Leadership. "A function of knowing yourself, having a vision that is well communicated, building trust among colleagues, and taking effective action to realize your own leadership potential" (Bennis, n. d., para. 7).

Learning. "Permanent change in behavior that occurs as a result of experience" ("Dynamic Flight Glossary," 2004, para. 66).

Morality. "Concern with the distinction between good and evil or right and wrong; right or good conduct" (Word Reference (b), n. d., para. 1)

Service-learning (S-L).

Service-learning is a course-based, credit-bearing educational experience that

allows students to (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 civic responsibility. (Bringle & Hatcher,

1995, p. 112)

Social responsibility.

Developing adolescents' social skills while enabling him or her to be active and

responsible members of their larger social and political community. Social

responsibility is multidimensional in that being responsible goes beyond just

being respectful of others; it means experiencing, as well as appreciating our

interdependence and connectedness with others and our environment. (Polk, n. d.,

para. 1)

Student development. "Facilitating student learning, and personal, academic, and career

development that includes an implementation of educational plans which are compatible

with the life and career goals of the student" (Metropolitan Community College, 2004, para. 2).

Volunteerism. "Volunteerism is the willingness of people to work on behalf of others, without pay or other tangible gain. ... work on an impromptu basis, recognizing a need and filling it..." (Wikipedia, 2005, para. 1).

Limitations

Limitations of the study might be contributed to biases against service and volunteering in the community. Another is the size of the population compared to the size of the institution. The researcher has very few classes to research due to the low number of S-L activities on campus relative to the total amount of classes on campus. Younger students and older students might also contribute to the limitations, for their thought process could be considered "young" or "too old."

Chapter II: Review of Literature

Introduction

"Service-learning (S-L) programs emphasize the accomplishment of tasks which meet human needs in combination with conscious educational growth. They combine the needed tasks in the community with the intentional learning goals and with conscious reflection and critical analysis" (Kendall, 1990, p. 20). Some say that there are other purposes of S-L that enhance the students' experiences by integrating academic study and service. Some purposes are to encourage and promote various benefits and developmental aspects of higher education (Binard & Leavitt, 2000). In Janet Eyler and Dwight Gile Jr.'s comprehensive study in 1999 (as cited in Steffes, 2004), the researchers suggest several likely outcomes of S-L for the students involved:

- Increased sense of citizenship (values, efficacy, and commitment to social responsibility);

- Development of stronger analytical and problem-solving skills;

- Enhanced personal development (self-knowledge, spiritual growth, finding reward in helping others);

- Increased leadership skills;

- Greater cultural awareness and tolerance;

- Enhanced social development skills;

- Improved interpersonal development (working with others, communication skills) (p. 2).

S-L is said to aid students use their newly acquired skills knowledge in other academic situations in real-life situations in their community. These benefits, developmental aspects and S-L outcomes in this paper are going to be categorized into seven areas: social and civic responsibility, intellectual development, leadership development, cross cultural development, moral and ethical development, career development and personal development.

History of Service-Learning

Before investigating the various aspects of the seven areas of development, the history of S-L might be helpful to understand the birth and development of the idea. The idea of serving others has been included in education for centuries; it has not been until the past 30 years that a national S-L movement has begun to take the educational community by storm. It has been described as the quiet phenomenon taking place on campuses across the country in Mary Prentice and Rudy M.Garcia's article about the next generation of education (Prentice & Garcia, 2000). "The roots of community service can be found in the pioneers' ethic to help one's neighbor with harvesting crops or raising a barn" (Wade, 1997, p. 23-24). On site training grounds for new workers and internships for college and high school students are not new or novel ideas. "The craft professions have routinely used the term 'learn by doing' for centuries to pass their expertise on to one another. Learn by doing experiences or experiential learning is set apart in higher education as the goal of having students observe and reflect on their current actions in order to formulate future practice" (Steffes, 2004, p. 2). S-L could be characterized as a stem from internships, field work and cooperative education for students in order for them to gain practical experience in professional education.

In the early 20th century, many launched the principles of experiential education as an established pedagogy. In 1984 David A. Kolb outlined an experiential learning model including four elements: concrete experience, observation and reflection, the formation of abstract concepts, and testing in new situations. He wrote that the learning process often begins with a person carrying out an action and seeing the effects of the action; the second step is to understand the effects of the action. The third step is to understand the action, and the last step is to modify the action given a new situation. This learning model is used to today as one of the

standards to support the use of learning through experience outside the traditional classroom. This model has been powerful for some institutions to allow students to, both cognitively and affectively, explain and describe their experiences.

Although S-L is said to be sprouted from the lessons learned as a result of the community service movement in the 1960's and 1970's (Kendall, 1990) there still was no sign of any formal association or group dealing with S-L in the classroom. Those in the movement learned about the balance of power and the drawbacks of helping others and doing good. The first organizations with decades of work in S-L that started the trend were the National Society for Experiential Education and the Council for Adult and Experiential Learning. In the last several decades, more key events have influenced the development of S-L such as: Campus Outreach Opportunity League (COOL) formed by college students in 1984 to educate and empower students to strengthen the nation through service; Campus Compact, formed by university and college presidents in 1985 to expand the opportunities for public and community service in higher education and to advocate the importance of civic responsibility in students' learning, an advisory group that gathered in 1989 to create "Principles of Good Practice for Combining Serve and Learning," (Weigert, 1998, p. 5). In 1993 President Clinton and Congress passed the National and Community Service Trust Act. This Act established the Americorps program to involve college-age students to serve their communities. The Act also greatly increased the generation of funds for K-12 S-L programs and further developed the program for higher education S-L (Wade, 1997).

What is Service-Learning?

A diverse group of S-L educators nationwide formed the Alliance for Service-Learning in Education Reform (ASLER) in recognition of the need for a widely agreed upon definition of S-L and a set of standards by which to judge programs. The group's definition read as follows:

Service-learning is a method by which young people learn and develop through active participation in thoughtfully-organized service experiences: that meet actual community needs, that are coordinated in collaboration with the school and community, that are integrated into each young person's academic curriculum, that provide structured time for a young person to think, talk and write about what he/she did and saw during the actual service activity, that provide young people with opportunities to use newly acquired academic skill and knowledge in real like situations in their own communities, that enhance what is taught in the school by extending student learning beyond the classroom, and that help to foster the development of a sense of caring for others. (Wade, 1997 p. 19-21).

The components of curriculum integration and reflection are what set S-L aside from community service. Community service tends to be extracurricular activities of clubs or organizations, while S-L learning is a pedagogical method for which service projects form the basis of leaning opportunities and experiences (Wade, 1997, p. 20). According to Kendall (1990) there are two factors that distinguish S-L programs from the other community service and volunteer programs. S-L programs foster participants' learning about the larger social issues behind the social needs to which they are attending and problem solving. S-L programs help the participants see their questions in the larger context of issues of social justice and social policy.

When collecting and collaborating with S-L experts, Wade (1997) proposed six steps to including S-L in the classroom: 1) Preparation is a critical aspect of quality programs. This involves careful planning by all those involved in the project and a timeline configured. This is where the objectives are sought and the goals of the project. 2) Collaboration with the instructor, community and students is important to all be on the same page and understand the need and the objectives of the project. 3) Service is where the action of the project will take place. In this step, an instructor is to identify what service the students will partaking in and doing in the community. Possibilities for service projects are endless and could be identified in the collaboration phase. 4) Curriculum integration is where the instructor identifies how this fits the course goals and objectives of learning. How does this service allow them to more understand the topics taught and apply what is learned? 5) Reflection is a time for the students to explain their experiences, what they liked, what they learned and other thoughts to bring meaning to the project. Students can develop critical thinking skills and a further understanding of community issues and what their role is through reflection. 6) Celebration gives the all parties involved a sense of empowerment, celebration and recognition from each other and the community. It is important to recognize the efforts of the students who are taking on new responsibilities and offering their hearts and hands to aid those in the community. These are just the basics for instructors to implement S-L in their classrooms and learning experiences

Today UW – Stout is a member of Campus Compact statewide. There is evidence of S-L happening in certain classrooms, but there fails to be an institution-wide initiative to challenge all instructors to incorporate service or experiential learning in the classroom.

Service-Learning Outcomes: Social and Civic Responsibility

Democratic citizenship involves judgment, choice and action. Literacy in citizenship requires more than knowledge and information; it also adds the exercise of personal responsibility, active participation and personal commitment to a set of values (Kendall 1990). Fostering civic responsibility promotes feelings of care, concern and for one's community and nation. If these students are involved early, they can understand action relates to a better civic life around them. Voting and political involvement will increase if students are able to actively see the government's involvement in community agencies (Waterman, 1997). Kendall stated that these students are allowing meaning to come into their lives and discharging their obligation to society.

The intent to serve is seen through the attitudes of youth and various categories. Whether it is environmental issues, civic involvement or service to others, social responsibility will become an aspect they cannot hide from once they are introduced to S-L. The attitudes when immersed in S-L events and activities will depend on the attitudes before the S-L and the introduction and preview to the issue they are serving. If these attitudes are morphed in an introductory session to the S-L project, it is likely that the youth will serve the community after completing the S-L class or project (Waterman, 1997). Social responsibility is learned while the service is taking place and the students are learning more about the needs of the community and how they have helped up to the point of completion. This social responsibility will again play a role when discussing personal development through S-L.

Service-Learning Outcomes: Intellectual Development

It is said that students learn more from direct encounters with significant human problems than from a book or lecture in the classroom. S-L uses students' experiences outside the

classroom sources for conceptual or theoretical understanding of societal and community issues (Binard & Leavitt, 2000). They enter new settings and encounter unfamiliar people from whom they gain new information and understanding. Alan Waterman identified learning through action as the way "students can remember the material more vividly through the action in the community. They gain a clearer perspective of their skills they learn as they are putting them to use in their S-L activities" (Waterman, 1997, p. 3-4).

"When learning is from real life, and the consequences are real; you may have to question the surface appearance, the easy answer, and grapple with the deeper complexities of life and relationships. In giving service to others, one travels on a road that brings one into contact with life's ultimate situations" (Kendall, 1990, p. 247-56). Binard and Leavitt (2000) related this idea to David Kolb's learning cycle. First, the students' understanding is challenged and they are creating perplexity through an introduction of community issues. S-L offers reflective exercises for students to put into different contexts their thoughts of their experiences and what they have learned in different areas. Reflective exercises will enhance their critical thinking skills that could broaden their perspectives of what their experiences are teaching them about their community and the issues they are facing. This, in turn, will enable the students use decision making skills they have acquired. S-L activities can place students in situations where hard decisions will have to be made that could have an effect on more than just the population they are working with (Binard & Leavitt, 2000). They are going to make decisions that they normally have not had the chance to or been in the situation that requires the skill. They will have and enhanced responsibility to make decisions that are in the best interest of the group in need to address the issue at hand.

Amy Strage showed evidence in her study in 2004 that students manifest academic benefits from participating in S-L. Strage compared students involved in S-L semesters with those that were involved in "regular" semesters. She saw that the differences were attributed to the enhancement learning afforded by the opportunity to reflect on the material more thoroughly through S-L reflection exercises. They were able to make more explicit connections among the course concepts and "real world examples." Strage used J. Eyler's thoughts to characterize S-L as being "about doing, about action, about learning from experience and using the knowledge and skills" (p. 2). Strage brought this back to relating S-L aspects to academic learning and cognitive development that she expected to be enhanced. These aspects she identified were in line with the above stated as the "ability to identify complex, ill-structured problems" and coming up with strategies and decision to suggest solutions (p. 3). This could be identified as the transfer of learning in the application of knowledge to new problems and make sense of conflicting material to make difficult decisions.

Service-Learning Outcomes: Cross Cultural Learning

Even carefully crafted guidelines to S-L can do damage if they are not placed in the context of social realities (Kendall, 1990). Different and competing interests as well as the outright conflict, based on class, race, gender and even nationality can have a negative effect on the efforts by students if not taken in to consideration carefully. Cross cultural learning and reciprocal learning need to be included in the curriculum and considered before the learning in the cases where S-L is going to include social and community aspects listed above.

Students gain experience in sociology, history, economics, political science, psychology, languages, literature and others that enrich their living in the culture (Kendall, 1990). All these can be gained through experiential learning dealing with service. Students are going to be

introduced to cultural areas and aspects that are new and foreign to them. Through service and learning, they can use their skills and knowledge to relate culture to class material and other real-life experiences. These experiences and new cultural lessons are going to aid in intellectual, personal and career development. Embracing and understanding cultural diversity will also enable them to enhance their leadership skills as well as the other areas of development to further their college life experience. The experience of S-L is an ideal vehicle for the mutual confirmation as students study and reflect in their own cultural backgrounds in relation to others.

Service-Learning Outcomes: Leadership Development

S-L can be the application of leadership skills, but more importantly can develop the skills to apply leadership attitudes, leadership knowledge and leadership skills. It has proposed that S-L was an effective way to develop leadership skills by providing leadership opportunities, projects set in the community that offer students hands-on experiences with their leadership skills and introduce a sense of civic value through active involvement in the community.

Binard and Leavitt (2000) opened "Discovering Leadership through Service" with leadership concepts that can be related to S-L. Three concepts were found in contemporary approaches that can connect to those experiences students have in S-L: vision, collaboration and change. With a shared vision within groups, students can address community problems together fostering commitment to the issue. Collaborating to achieve a common goal in the community, individuals can provide meaningful service while working together in contrast to if they worked alone. Finally, students can practice their leadership skills through S-L and empower others to create positive change within the community.

Students can learn how to apply, integrate and evaluate knowledge of leading in society and taking a leadership role within their service activities (Kendall, 1990). These activities

dealing directly with the understanding if the political and social action skills required for effective citizenship. They develop and practice analytical skills necessary for understanding the social make up of the delivery of goods and services. Social consciousness mixed with leadership are going to give them the sensitivity and caring ability to interact and help the community in these activities and projects. Like in their intellectual development through S-L, students are again going to enhance their critical and analytical skills gained through leadership in these interactions and reflections.

Service-Learning Outcomes: Moral and Ethical Development

S-L programs prepare students for the situations and decisions they are going to have to face in the real world. S-L prepares for effective problem solving that requires development in the realms of logical reasoning, social role taking and moral and ethical reasoning. Knowledge of the broad issues emerging in society can help an education goal that strives to instill multiple moral and ethical skills in students for development. Logical reasoning skills in dealing with problems containing multiple interacting variables can develop moral and ethical reasoning when handling sensitive issues in the community.

It is important to understand the relationship of moral development to S-L because students are more likely to face dilemmas arising from their involvement in the activities and during the reflection process. If instructors are knowledgeable about moral development, they can understand how the students are dealing with the moral and ethical dilemmas and how the development in the reflection process can lead to more analytical reasoning (Jacoby, 1996). Decision making and problem solving skills incorporating societal and moral value considerations in a bigger society perspective will enable these students to learn what decisions affect the community (Kendall, 1990). Experience with moral and ethical decisions and

reasoning will not only prepare students for career or professional situations, but will develop their interpersonal skills. These skills will not only be the driving force for the success in the future, but with all interactions and relationships in their lives.

Service-Learning Outcomes: Career Development

"Experiential learners or those involved in S-L are more likely to have career plans in their upper class years. S-L experiences are offering these students opportunities to improve their human relations skills, learning how to interact with different populations in their community" (Binard & Leavitt, 2000, p. 25). The advancement of these skills is going to move them in front of other students experiencing "normal" learning inside the classroom without interaction in the community.

Compared to non-experiential learners, learners involved in experiences outside the classroom, upon graduation had a higher rate of entering the human services field. Most of the students stated that the experiential learning made them think twice and more interested about entering the human services field (Kendall, 1990). Students gain the guidance for future career paths by getting involved with different populations and different community issues. They are able to sort through the activities they enjoy and excel in and are more likely to make a career decision based in their S-L experiences (Binard & Leavitt, 2000). Experiences with a wide array of work environments spark students to think about future career preparation and might even prove the decisions they have made prior (Waterman, 1997).

With social and civic responsibility growing from S-L involvement, students are more likely to continue to serve in the communities in which they reside after their experience whether they have graduate or not. Ninety percent of the students in the study said they would do it again

if they had the chance. Students in these programs are more likely to be involved with community organizations after graduation (Kendall, 1990).

Service-Learning Outcomes: Personal and Interpersonal Development

Through S-L, students assume roles of significance and affirm a new role through meaningful interactions with others. They broaden their world, and increase the range of places and people they know about and also with whom they feel a connection. They not only serve others but gain insight and affirmation on the population and their way of living. It becomes a personally felt obligation to fulfill commitments to others. It may depend on the nature of the project, but students tend to experience development in this area in regards to the social issues integrated in the project (Kendall, 1990).

S-L projects are focused on developing skills necessary for conducting these projects; in turn, these skills are used to make a difference in someone's life and the surrounding community. Feelings of self efficacy, ability to bring out the desired outcomes, are brought out through the uses of the developed skills. They are in the mode of knowing they can complete the project and reach the desired objectives. Another important personal development skill, self esteem, will enable these students to value themselves through S-L (Waterman, 1997). Self esteem rises through self efficacy which rises through the service to others. This course of development can only happen if the students involved see themselves as making a difference through their service contributions and that they are worth their efforts (Binard & Leavitt, 2000). Through this process, service to others can promote reflective development of their attitudes towards themselves and the S-L taking place.

Service-Learning in Biology

According to Jennifer Edwards (2003), the combination of science education and S-L has dynamic potential. She believes it "allows teachers to incorporate the tenets of constructivism and in their practice, while enabling students to manage their own learning" (p. 8). Edwards agrees with other authors when stating that S-L creates partnerships with business and students to solve real problems in powerful and meaningful ways. Edwards and her third grade students incorporate science and butterfly babysitting with learning to give the students opportunities to use newly acquired skills and knowledge in real-life situations and the opportunity to extend the learning to outside the classroom walls.

Edwards (2003) compares and contrasts the idea of S-L and constructivism. In S-L, science and constructivism students are encouraged to test their personal knowledge through activities such as project based learning. One example of this comparison and contrast is students "construct knowledge through adding new knowledge to pre-existing data (constructivism), the students use experiences to put academic knowledge into practical real life situations (S-L) and science standards provide information of key science concepts" (p. 9) With the butterflies, the "activities help students reinforce the importance of butterflies to biodiversity" (p. 9). Their learning is enhanced through making a difference. Edwards claimed that once her students found out that others in the community were not acting in the best interest of the butterflies and their habitat, they wanted and needed to do something to help.

One way for Edwards' students to share their work is to make presentations to the City Council and other constituents that might benefit from knowing the results and recommendations of the students (2003). This was a result in the students' desire to voice their concern about the environment and how the butterflies were living. Edwards had her students involved in the

community related to this issue and, as a result, felt they had more ownership of the activity and the possible future. In her conclusion, Edwards stated that S-L has great appeal to science instructors "as a method of addressing the need for students to achieve goals academically as well as personally in a project-based way that can motivate" all types of students (Edwards, 2003, p. 11).

In another success story in a science classroom told by Barbara A. Holland (2001) in her article on a model for assessing S-L and community-university partnerships, a professor has her class work in partnership with the city to measure the quality of urban watersheds and develop citizen education programs. To do this, the professor prepares her biology class by teaching them about the indicators of water quality as well as issues and policies with the water in the urban area. They not only learn the biology material about the water, but also about recent community issues. In this class the students were able to practice communication skills with those they worked with in the community and lead field trip for other residents interested in the issue as well. Like in other literature, these students were given the opportunity to enhance skills other than knowledge of the subject. "In effective science teaching that includes S-L, the teacher moves from being the gatekeeper of knowledge and resources to acting as an ally and a partner in learning and social action" states Edwards (2003, p. 11).

Chapter III: Methodology

The purpose of this study is to analyze the difference in the skill/student development between volunteerism and formal service-learning (S-L) activities in higher education. This chapter will include how the researcher chose the subject, what type of instrument was used, data collection procedures and how the data was analyzed.

Research Design

The design used for this study will be experimental in the terms of looking for indicators of S-L developing students, their skills and benefiting their college career. An experimental design is needed based on the objective of wanting an idea of the benefits of S-L in the classroom. There is no known study that has taken place on this campus in relation to S-L and science. In order to compare and contrast S-L and volunteerism, there needs to be some kind of experimentation with the participants. Some instructors include volunteer hours or projects in their curriculum, but to contrast this with formal S-L in the same biology class requires initial experimentation. In relation to the data needed for this study, experimentation is going to allow the researcher to obtain candid and spontaneous thoughts and feelings about the S-L process and activities. The responses and reactions during some discussion and reflection are going to allow for fresh, valuable data. The data from the experimentation will allow the researcher to meet the objective of developing reasoning for S-L models to be used in more classrooms.

Subject Selection and Description

The population will be the 399 students attending UW-Stout enrolled in lower level biology courses. Before the start of the spring semester, the researcher asked instructors teaching the same class containing mostly similar material to participate in the study, by allowing their students to be surveyed and observed during class time. Two instructors responded who taught

five different sections the same class between. Each of these classes (instructors) will have two sessions of that class participating. One instructor is considered to exemplify volunteerism in their class and the other will use a general S-L model integrated into the curriculum. In this study, students in Biology 111: Science, Society and the Environment are the participants will be who will be engaged in, what the researcher defines as, volunteer activities or formal S-L direction.

The cluster sample will be the classes in which the Biology 111 instructors volunteered to have their classes participate in the study. The other determining factor of the sampling is whether all the students enrolled in these classes attend their section on the given days the study is taking place. The Biology 111 students took this course as a general education requirement and most likely did not need this class as a requirement for their major. The population is made up of students with different majors, levels in school and could be enrolled in various classes that contain volunteerism or S-L. The sample is contained to those students attending Biology 111 taught by one of two instructors. This class is normally taken by freshmen to get their requirements out of the way, but there is an occasional junior and senior status student that has left some general education classes to intertwine with the more intense major requirements. There are more female students than male and more freshman women than men. All the students in these classes are competent in reading and writing according to standards determining the acceptance to UW-Stout.

Instrumentation

A survey was developed after analyzing the National Communication Association's Assessment Resources in Service-Learning and Students (2005), and a study titled Psychometric Properties and Correlates of the Civic Attitudes and Skills Questionnaire (CASQ): A Measure of

Students' Attitudes Related to Service-Learning, done and supported by Tulane University (Moely, Mercer, Ilustre, Miron, & McFarland, 2002). These resources helped mold the questions in which the researcher needed to gain data pertaining to the seven developmental categories relating to S-L. Each of the questions is a measurement of one of the categories with two to four questions attached to each area. Questions one and two measure social and civic responsibility; questions three, four, five, six, seven, fourteen and fifteen measure intellectual development; questions 10, 12, 13, and 16 measure leadership development; questions eight and nine measure cross cultural development; questions 11, 17, and 23 measure moral and ethical development; questions 18 and 19 measure career development; and questions 20, 21, 22, and 24 measure personal development (Table 11, Appendix C). The scoring is a four point scale trying to eliminate students circling neutral for their answers. The researcher wanted to challenge the students to think about themselves, their college careers, their skills, their futures, and their dedication to the community.

Questions as to which the researcher partnered with the S-L participating instructor to formulate were based ideas and thoughts talked about in the books of Holland, Jacoby and Wade. Questions were validated based on past studies and what the authors thought were necessary preview and reflections questions. The researcher and instructor met with the class a week before the service project to discuss what the project would consist of and how it related to the class. The preview questions were used during a discussion period of both classes (see Appendix D). The reflection discussion took place in a discussion period of the class in one of the last weeks of the semester. Reflection questions (see Appendix D) that allowed the students to explore their efforts and revisit the reason they were doing the project and how it related to the class. The

students were given the opportunity to reflect on their personal experiences as well as how they thought it related to the class.

Data Collection Procedures

To start the study the students in the S-L class sections were asked to fill out a 24 question survey serving as preliminary data to compare post survey data. The researcher asked the students to be honest for this was going to be compared to another survey taken at the end of the course. This survey data will serve as the quantitative data to measure the development of the students and any benefits resulting from the S-L. The survey was conducted during class. After the volunteer hours and S-L projects were finished and the semester was coming to a close, the students in both the volunteer and S-L classes were asked to complete the same 24 question survey. This was the only survey the volunteer students completed and the S-L students completed the survey after the reflection discussion was held.

In addition to the survey, the researcher and instructor, using formal S-L, collaborated to engage the students in pre and post discussions to the activities. Before the service was to be provided, the students engaged in a preview discussion about the service and the nature of the project. In addition to learning about the details of the projects within the S-L class, the areas covered in this preview discussion were the mission of Earth Day and how it relates to the mission and objectives of the class, who they were going to be helping and how they were going to be providing this help, and what they would be learning through the projects and activities. They were also asked to identify the short and long term activities and the goals of each (see Appendix D).

After the activity, the students were involved in a reflection discussion to qualitatively measure the benefits and development of their skills and community engagement. Areas covered

in the reflection period included, but were not limited to, their favorite experience of the class, one thing they learned that they did not think they would, what are some possible solutions to these community needs, and what their role in the community is now after taking this class (see Appendix D). Notes were taken by a third party other than the researcher and S-L instructor in both the preview and reflection discussions to act as qualitative data. In this case, the feelings and thoughts of S-L students were wanted to measure the effect of S-L and its contrast in comparison to volunteerism.

Data Analysis

The survey data was analyzed through the statistic program Minitab. Various statistical analyses were used with the survey data. When analyzing the data, the two S-L sections were grouped together as one group and the same with the two sections of volunteer students. The mean and standard deviation was figured for each group. The mean and standard deviation was figured for both the pre-survey and post survey for the two sections of S-L students. These two sections were grouped together for this analysis as well.

The qualitative data from the discussions was compared to the pre-survey and post survey data to accompany any feelings, thoughts, or developmental changes. Both the S-L post survey data and the volunteer survey data was compared by conducting a t-test and charting the differences in responses.

Limitations

The selection of participating classes might not be an ideal sample of students at the University of Wisconsin – Stout. These students are from different class levels as well as different places in their college career and most likely in different stages of student development. Due to student development stages, students might not be able to identify their development and

possible benefits of different experiences. Another limitation might be that students did not have a beneficial service experience and therefore take the survey differently than those that enjoyed themselves and found meaning on the service projects. The fact that the researcher is only surveying the students and their outcomes is limiting the amount of data that could be collected from all parties involved in the service to the community.

Even though the students' grades are dependent on attendance to the discussion period, not all students enrolled in the class attended all the days the study took place. There was more post surveys filled out than there were pre-surveys. When creating the survey, the researcher did breakdown the questions so each developmental area this study is covering is measured by at least two questions. One limitation might entail some areas having more than doubled the amount of questions to measure that specific area. Since the class is made up of all different ages and college level classification there could be some students who are already developed in certain areas. Some students might develop differently and through different interactions.

Chapter IV: Results

Introduction

The purpose of this study was to analyze the difference in the skill/student development between volunteerism and formal service-learning (S-L) activities in higher education. The same survey (see Appendix A) was given three different times to two different classes; both the S-L and volunteer classes. A pre-survey was given to the S-L class (n=42) to start the study. After this survey was completed, the researcher and S-L instructor engaged the students in the preview discussion with questions from the S-L discussion outline (see Appendix D) to collect the qualitative data. After the pre-survey and preview discussion, both the S-L and volunteer classes engaged in their service projects in the community during class times for the remainder of the semester. Upon completion of the projects, the volunteer students (n=56) were asked to fill out the survey; this was their only involvement in this study. After the projects, the S-L students were engaged in a reflection discussion with the researcher and S-L instructor based on questions from the S-L discussion outline. After the reflection discussion the S-L students (n=37) were asked to fill out a post survey concluding the data collection for this study.

Two comparisons were made with the survey data that was collected. The first comparison was between the pre and post surveys of the S-L students to see possible increase in any of the developmental categories. The second comparison was between the volunteer post surveys and the post surveys of the S-L sections to document possible increased development in the S-L sections, as opposed to the volunteer classes, after all classes had engaged in some type of service.

Findings

In the preview discussion with the S-L students (n=42), topics that were discussed included what their service project entailed, what the mission of the class and Earth Day were in relation to one another, who they were going to be helping, what they were going to learn through these projects, and what the individual goals of the projects were. The following questions were asked from the S-L discussion outline and the following responses were received: What is the mission of Earth Day and how does it relate to the mission of the class?

- Act locally, think globally

- Be aware of the earth's situation

- Have a clean environment that is more sustainable to human life

- Make a difference, be a citizen scientist by being active, knowledgeable and acting on issues. Have fun and help the environment

Who are we going to help?

- Save the environment from pests

- Help the environment for people and nature

- Help campus from the exotic plants that are taking over

- People downstream

- Fishermen

- Living things in the creek

What are the long-term goals of the projects?

- Trout be able to swim in good water

- Help Dunn County

- Educate the farmers

- Help the animals and the sewage plants

- Help the rest of the students continue the project and see results in 10 years

What are we going to learn?

- To set a good example for other students

- What plants are not good for the environment

- How to apply this knowledge and service in other places

Each category of possible skill/student development resulting from S-L experiences in the classroom discussed in Chapter II had several statements each from the survey measuring that category. The mean and standard deviation were figured through Minitab statistical software for each of the three survey groups. The results will be grouped into the developmental categories and the statements that measured them, showing a comparison of the mean and standard deviation of each survey group. After each of the 24 statements, students were asked to circle the level of agreement that best suited their thoughts and feelings. Numbers corresponded to the level of agreement as follows: 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree. The tables on the following pages show the valid means and standard deviation of what the researcher thought were the 10 statements that generated the most meaningful data based on the responses from the students in each class. The tables are listed based on the seven identified categories of development from S-L and the survey statements which correspond to measuring aspects of that development category.

Social and Civic Responsibility

Statements one and two on the survey measured students' awareness of society and the community around them. These statements also help measure whether the student wants to be or already is involved in the community and addressing its needs. Table 1 shows results from

statement one, indicating a development in social and civic responsibility thoughts of the students. There is a greater development between the two classes at the end of the class than of the S-L class after the project and reflection. Results for statement two were not significant or conclusive; please see Appendix C for further information.

Table 1

I am concerned about local community issues.

	Service-Learning Class			Volunteer Class	
Mean Pre-survey	Standard Deviation Pre-survey	Mean Post-survey	Standard Deviation Post-survey	Mean Post-survey	Standard deviation Post-survey
3.09	.52	3.29	.46	2.94	.52

Intellectual Development

Statements 3, 4, 5, 6, 7, 14, and 15 measure the development of students' sense of academia and how they learn. These statements also measure how the students view themselves in the areas of critical thinking and problem solving. Some of these statements measure how the students feel about relating class to real-life situations and if these projects help them better learn the subject. Table 2 shows results from statement 4. The means of the responses showed significant development in the S-L class after the project. There was almost as much development difference between S-L and volunteer classes after the project.

Table 2

The experiences in this course helped me better understand the concepts presented in

this course.

	Service-Learning Class			Volunteer Class	
Mean Pre-survey	Standard Deviation Pre-survey	Mean Post-survey	Standard Deviation Post-survey	Mean Post-survey	Standard deviation Post-survey
3.31	.64	3.72	.45	3.40	.53

Table 3,exemplifying the results of statement six, shows that it is possible to assume the

S-L students benefited more from the S-L than the volunteer students benefited from

volunteering based on the means of the S-L group being slightly higher than those of the

volunteer post survey. The S-L students responded that their problem solving skills improved

due to the project and reflection. During the reflection period with the S-L students, which will

be covered later in the chapter, they identified some hints to their intellectual development

during the process. Results for statements 3, 5, 7, 14, and 15 were not significant or conclusive;

please see Appendix C for further information.

Table 3

I can think analytically when solving problems.

	Service-Learning Class			Volunteer Class	
Mean Pre-survey	Standard Deviation Pre-survey	Mean Post-survey	Standard Deviation Post-survey	Mean Post-survey	Standard deviation Post-survey
3.04	.60	3.32	.52	3.16	.53

Leadership Development

Statements 10, 12, 13 and 16 measure the thoughts of the students pertaining to their leadership skills. These statements identify if the students feel they communicate well with others, take the lead in a group setting, involve themselves in various aspects on campus, and lend a helping hand when needed. Table 4 shows the development of students' views on whether they can make a difference in the community (statement 10).

Table 4

I feel that I have a positive impact on the local social problems.

Service-Learning Class				Volunteer Class	
Mean Pre-survey	Standard Deviation Pre-survey	Mean Post-survey	Standard Deviation Post-survey	Mean Post-survey	Standard deviation Post-survey
3.09	.60	3.51	.56	3.07	.46

Table 5 shows results from statement 13, which indicate that more S-L students wanted to take the lead in a group setting after the project and reflection. S-L students identified some leadership development for themselves personally during the reflection discussion which will be discussed later in this chapter. Results for statements 12 and 16 were not significant or conclusive; please see Appendix C for further information.

Table 5

I would rather have someone else take the lead in a group setting.

	Service-Learning Class			Volunteer Class	
Mean Pre-survey	Standard Deviation Pre-survey	Mean Post-survey	Standard Deviation Post-survey	Mean Post-survey	Standard deviation Post-survey
2.36	.77	2.21	.65	2.29	.65

Cross Cultural Development

Statements eight and nine measure the students' thoughts on diversity and differences. The statements hoped to see if there was a development in the tolerance and acceptance of those from different backgrounds and experiences. These statements help measure the understanding of citizens in the community they have yet to know who are benefiting from their service. As Table 6 shows, the means for statement eight were close and there was hardly substantial development in acceptance of others whom are of different background and experience. Results for statement 9 were not significant or conclusive; please see Appendix C for further information.

Table 6

I prefer to be around people who are similar to me in background and experience.

	Service-Learning Class			Volunteer Class	
Mean Pre-survey	Standard Deviation Pre-survey	Mean Post-survey	Standard Deviation Post-survey	Mean Post-survey	Standard deviation Post-survey
2.95	.72	2.90	.83	2.83	.78

Moral and Ethical Development

Statements 11, 17 and 23 measure the moral and ethical decisions the students have been faced with and whether or not they believe themselves to be someone who is reliable and hardworking. The data in Table 7 tells us that there was the decrease of development when it came to ethical decision making (statement 17). There is a slight development between both the post survey data with relative high agreement among the students. Results for statements 11 and 23 were not significant or conclusive; please see Appendix C for further information.

Table 7

When dilemmas arise, I usually make an ethical and moral decision.

	Service-Learning Class			Volunteer Class	
Mean Pre-survey	Standard Deviation Pre-survey	Mean Post-survey	Standard Deviation Post-survey	Mean Post-survey	Standard deviation Post-survey
3.36	.48	3.24	.43	3.14	.48

Career Development

Statements 18 and 19 measure how prepared the students feel for a future career. These statements also measure how important the students feel it is to continue to help those in need after they graduate. Table 8 shows that there was a bigger development between the pre and post S-L students in relation to feeling prepared for a future career with more agreement after the project (statement 19). There was a slight development of the S-L students in relation to the volunteer students. Results for statement 18 were not significant or conclusive; please see Appendix C for further information.

Table 8

I feel well prepared for my future career.

	Service-Learning Class			Volunteer Class	
Mean Pre-survey	Standard Deviation Pre-survey	Mean Post-survey	Standard Deviation Post-survey	Mean Post-survey	Standard deviation Post-survey
2.59	.65	3.00	.52	2.94	.59

Personal Development

Statements 20, 21, 22 and 24 measure the students' feelings about themselves, how they fit into society, and how much control they have over the things that happen to them. These statements measure self-esteem, interpersonal skills, and self discipline, just to name a few. The data in Table 9 illustrates results of statement 21 and shows development in the students' self esteem with considerable standard deviation numbers. The data shows the S-L students started out more developed in the pre-survey than the volunteer students were at the end of the semester.

Table 9

I feel I don't have much to be proud of when it comes to my strengths.

	Service-Learning Class			Volunteer Class	
Mean Pre-survey	Standard Deviation Pre-survey	Mean Post-survey	Standard Deviation Post-survey	Mean Post-survey	Standard deviation Post-survey
1.72	.54	1.62	.59	1.89	.68

Table 10 shows a difference in the mean of the S-L students after the project reflecting a development in how they feel about their self control and of their surroundings (statement 22).

This also shows a substantial evidence of development of the S-L students compared to the volunteer students. Results for statements 20 and 24 were not significant or conclusive; please see Appendix C for further information.

Table 10

I have control over the things that happen to me.

	Service-Learning Class			Volunteer Class	
Mean Pre-survey	Standard Deviation Pre-survey	Mean Post-survey	Standard Deviation Post-survey	Mean Post-survey	Standard deviation Post-survey
3.18	.58	3.35	.53	3.15	.57

After the service projects were complete, the researcher and S-L instructor engaged the students (n=37) in a reflection discussion based on questions from the S-L discussion outline. Topics discussed in the reflection included what the students learned, what was their most significant experience in the project, what they now know about the population they helped, and what they think the solutions are to the community issues they minimally addressed. The following questions and responses were results of the reflection discussion.

1. What did you learn (about the campus, about yourself, about the environment) during this experience?

    - How to grade a creek

    - Clear water doesn't always mean its clean

    - The projects are working

    - One person can make a huge difference

    - It's fun to get dirty and help the environment

- That everyday plants and bugs are exotic species that are bad for our environment

- Identify community needs outside of class

- To make a difference

- Take initiative and continue the good deed

- Changed the way of living

- How important knowledge and education is and to apply it daily

- Identifying the need and doing something to help out

- History of the environment

- How much we consume daily

2. What is the solution to the problem?

- Create awareness to the public

- Lead by example

- Get people involved in the projects outside of class

- Apply the knowledge that is learned

- Spread the word

- Raise more awareness by informing people of exotic species

- Communicate

- Work together

- When moving, lead by example and act in the new community

- Think globally, act locally

- Organic farming

- Continue learning

- Becoming one with our environment

- Recycling

3. What was your favorite experience in the class?

- All new outdoor experiences, going outside my comfort zone

- Being outdoors

- Getting rid of the exotic plants

- Earth Day-seeing the immediate difference from our service

- Knowledge of contribution

- The stream measurements-knowing there will be a bigger change in five years

- Educating others and sharing information outside the classroom

- The class had more useful information than other classes-not out of a book

- Working in a group to remove the exotic plants

- Seeing instant results from removing the exotic plants

- Gathering and grouping the bugs at the creek

- Fresh air

- Relating the classroom with life experiences

- Learning from others

- Consumption chart

- Instructor re-energized the experience in science

- Learning more outside the classroom

- All decisions regardless of where they are affect the world

- Seeing new bugs and their learning environment

- New group work experiences

- Feeling better about myself and doing what I learned

- Feeling more inclined to spread the word

4. What do you now know about the population you benefited?

- Helped the campus to open up more land by pulling the exotic plants

- Helped the campus grounds workers by taking a load off their jobs

- Allowed habitat to grow where it should

- Helped the fish and the animals in the creek

- Residents of the community

- Ourselves

- Other students on campus

Chapter V: Discussion

Summary

Volunteering in the community can be beneficial to the students and the receiving citizens, but through Service-Learning (S-L), students, instructors and the community are going to develop in multiple ways more than volunteering. In order for instructors to make the transition to implementing and incorporating S-L in their curriculum, there needs to be a reason.

The purpose of the study is to review literature and analyze other S-L activities to evaluate the developmental outcomes of S-L. A general overview of the impact of S-L in the classroom is the intent of this study with the purpose to begin the awareness of the importance of possible institutionalization of this practice.

After reviewing literature on S-L and the benefits of integrating it in the classroom in Chapter II, the methodology of the study and the selection of the population and sample were explained in Chapter III, and the quantitative and qualitative data from the surveys and discussion sections is included in Chapter IV. Two groups of biology students engaged in service activities were compared through survey data to measure the development and benefit of formal S-L in the classroom. The S-L students underwent additional preview and reflection discussion sections before and after the service project as opposed to the volunteer student group that solely completed the service project. The pre and post survey from the S-L students as well as the qualitative data from the discussions was used to measure the possible development of the seven identified areas over the course of the semester. The post surveys of both groups were compared to show the possibility of the S-L students developing more than those that volunteered.

Conclusions

After the survey data was collected, charted, and analyzed, the researcher made the following conclusions:

1. S-L students do experience intellectual development through hands on activities, problem solving, and making connections from the course content to the real world.

2. The personal development aspects students experience through S-L are projects that empower them to make a difference in the environment and take ownership of their campus and community.

3. Students need meaningful, hands on activities to be able to practice what is learned and retain the knowledge.

4. By learning about the population they are helping and how they are making a difference, students are more likely to keep serving others in need in their future careers based on their S-L experiences in the classroom.

5. Students who have experienced S-L in the classroom are more likely to consider leadership opportunities.

6. The survey used in this study had more questions than were needed to receive substantial data needed to make observations and conclusions.

7. Questions in the survey used were formed more complex than they needed to be for the students to rate their thoughts and feelings about the class and the projects.

Recommendations

The following recommendations are made by the researcher to implement S-L in the classroom (see complete S-L worksheet for instructors in Appendix E).

1. Identify community needs that would relate to your course content.

2. Further discuss and identify the procedures to implementing S-L in the classrooms.

3. Identify a centralized staff person or office for faculty resources when they want to implement S-L in the classroom.

4. Continue assessment and evaluation of current S-L practices for continuous improvement.

5. Complete an institution wide assessment of who is already engaged in S-L in their classroom; what agencies and community needs they work with and how does it relate to the course content.

6. Work with other instructors teaching similar classes to collaborate on ideas and projects.

7. When conducting a similar study, keep the survey questions broad enough for both S-L and volunteer students to answer about the same subjects. Also decrease the amount of questions in the survey to no more than 15. S-L students are going to understand the questions better, but the volunteer students need to have a survey that could be conducive to minimal competencies in service projects. Maybe write the survey keeping in mind the preview and reflection questions.

8. When conducting a similar study, ask the instructor if certain class periods could be mandatory in order to keep control of the sample sizes and maintain numbers from the preview to the reflection sessions.

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Appendix A: Survey

Student Survey
This survey is designed to measure general attitudes and feelings of college students. In this study we would like to know about your experiences and personal opinions in relation to volunteer work that you provide to the community. This information will be useful in comprehending and later enhancing the experience for others taking this class.

Please answer as honestly as possible, counting on your current feelings of the issues and situations raised. Please consider the community mentioned as the Menomonie community.

Class title and section #_____ Year in school   FR SO JR SR SR+

Please indicate how strongly you agree or disagree with each statement as a result of this class. Circle the number that best describes your response. (1=strongly disagree, 2=disagree, 3= agree, 4=strongly agree)

		strongly disagree	disagree	agree	strongly agree
1.	Being involved in a class or organization to improve the community is important.	1	2	3	4
2.	I am concerned about local community issues.	1	2	3	4
3.	I learn more when courses contain hands-on activities.	1	2	3	4
4.	The experiences in this course helped me better understand the concepts presented in this course.	1	2	3	4
5.	I have the opportunity to practice what was learned in this class.	1	2	3	4
6.	I can think analytically when solving problems.	1	2	3	4
7.	I feel classes are meant to make connections with the course material and the society around us.	1	2	3	4
8.	I prefer to be around people who are similar to me in background and experience.	1	2	3	4
9.	I understand who will benefit from the project we conducted in this class.	1	2	3	4
10.	I feel that I can have a positive impact on local social	1	2	3	4

		strongly disagree	disagree	agree	strongly agree
12.	I communicate well with others	1	2	3	4
13.	I'd rather have someone else take the lead in a group setting.	1	2	3	4
14.	Courses in school make me think about real-life in new and different ways.	1	2	3	4
15.	I can think logically in solving problems	1	2	3	4
16.	It is not necessary to volunteer my time to help people in need.	1	2	3	4
17.	When dilemmas arise, I usually make an ethical and moral decision.	1	2	3	4
18.	It is important for me to find a career that directly benefits others	1	2	3	4
19.	I feel well prepared for my future career.	1	2	3	4
20.	I can make a positive difference in my life.	1	2	3	4
21.	I feel I don't have much to be proud of when it comes to my strengths.	1	2	3	4
22.	I have control over the things that happen to me.	1	2	3	4
23.	When it comes to school, I put in 100% effort.	1	2	3	4
24.	I find it easy to make friends.	1	2	3	4

Appendix B: Consent Form

Benefits of Service-Learning (S-L) and Student Development in Science Fields

Investigator:	**Research Sponsor:**
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Description:
The objectives of this study are to measure the benefits of Service-Learning in science and technology classes. With participation, the investigator can identify the development of attitudes and skills based on the involvement in Service-Learning activities and reflections after the activities.

Risks and Benefits:
The results of this study could benefit the society in that Service-Learning could be incorporated into more classrooms. Other benefits are the sustainability of students continuing to serve the community and the development of skills and attitudes that can be transferable to other facets such as: career exploration, relationship skills, communication, and self worth.

Time commitment:
This survey should take you no more than ten minutes and can be done during your class period. Your participation can be beneficial to obtaining the maximum amount of data possible.

Confidentiality:
There is no information asked on this survey that could link your name to your answers. Your name is not included on any of these documents. Individual answers will be confidential, for the data is averaged with the entire class.

Right to withdraw:
Your participation in this study is voluntary. You may choose to withdraw for any reason without any adverse action. Should you choose to participate and withdraw later, there is no possible way to identify your anonymous document after you turn it into the investigator.

IRB Approval:
This study has been reviewed and approved by the University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study please contact the Investigator or the Advisor. If you have any questions or concerns, reports regarding your rights as a research subject, please contact the IRB Administrator.

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Statement of Consent:
By completing this survey and returning it to the investigator, you agree to participate in the project entitled, Benefits of Service-Learning (S-L) and Student Development in the Fields of Science and Technology

Appendix C: Data Table

Appendix C: Data Table

	----------Service Learning Class--------------------				Volunteer Class	
Survey Statement	Mean of Pre-survey	Standard Deviation Pre-survey	Mean of Post-survey	Standard Deviation Post-survey	Mean of Post-survey	Standard Deviation Post-survey
1	3.40	.49	3.62	.54	3.34	.51
2	3.09	.52	3.29	.46	2.94	.52
3	3.72	.54	3.83	.37	3.67	.51
4	3.31	.64	3.72	.45	3.40	.53
5	2.86	.70	3.56	.55	3.18	.61
6	3.04	.60	3.32	.52	3.16	.53
7	3.31	.62	3.56	.50	3.27	.44
8	2.95	.72	2.90	.83	2.83	.78
9	2.90	.86	3.45	.55	3.14	.62
10	3.09	.60	3.51	.56	3.07	.46
11	2.59	.56	2.67	.74	2.38	.89
12	3.40	.65	3.32	.47	3.25	.43
13	2.36	.77	2.21	.65	2.29	.65
14	3.13	.55	3.37	.63	3.00	.50
15	3.09	.60	3.24	.54	3.30	.50
16	1.95	.72	1.89	.93	1.87	.79
17	3.36	.48	3.24	.43	3.14	.48
18	2.86	.74	3.08	.66	3.01	.70
19	2.59	.65	3.00	.52	2.94	.59
20	3.54	.49	3.67	.52	3.34	.51
21	1.72	.54	1.62	.59	1.89	.68
22	3.18	.58	3.35	.53	3.15	.57
23	2.50	.58	2.71	.69	2.61	.65
24	3.40	.58	3.43	.64	3.25	.58

Appendix D: Service-Learning Discussion Outline

Preview discussion about project

Citizen science reasons to get involved (explain some reason why doing the project. Why others continue this work in the community after completion of the class.)

1. Meet new people
2. Become more connected and responsible for the natural world.
3. Have fun and make a difference

Questions (pre-project)

1. Is there a mission for our class? If so, should we write one?
2. What are the objectives for this class project?
3. What are we going to learn?
4. Who are we going to help? How many people are affected by this project?
5. What do we know about the people this project is going to affect or benefit?
6. What are the short and long term goals of the project?
7. What are some things to think about when doing this project?

Reflection questions (could be in journal format or discussion)

1. What was your best experience?
2. What was one thing you learned through this project?
3. How could the experience be changed?
4. Would you do this kind of project again outside class?
5. What do you know about the population you helped and the area you served that you didn't before this class?

Appendix E: Service-Learning Worksheet

Course name: _____

Course mission: _____

_____

_____

PLANNING

    1. Identify community needs that would relate to your course content.
-
-
-
-

COLLABORATION

    2. Contact community agencies or a staff member involved with community service to identify possible projects.

List possible agencies and what service they bring to the community:
-
-
-

    3. What type of service would you like your students to perform (collaborate with agency)?
-
-
-
-

CURRICULUM INTEGRATION

4. Discuss with your students why you are undergoing the project and preview the service with them before the start of the project. (Use Service-Learning Discussion Outline)

SERVICE

5. Perform service (remember to take pictures!)

REFLECTION

6. Ask students to reflect on their experience with service and the curriculum. This could be done in discussion or journal format (Use Service-Learning Discussion Outline)

CELEBRATION

7. Recognize the students' efforts and that of the agencies you partnered with. Recognition is important for the students to feel a sense of empowerment.

EVALUATION

8. Evaluate project, partnership, curriculum and other aspects of the service-learning in order to improve for the next semester. This could include (but is not limited to): discussion with students or community partners about possible improvements, analyze the written reflections, analyze the grades given, and use class evaluations.