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INTEGRATING SERVICE-LEARNING INTO WATERSHED MANAGEMENT PROGRAMS: OPPORTUNITIES AND CHALLENGES

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INTEGRATING SERVICE-LEARNING INTO WATERSHED MANAGEMENT PROGRAMS: OPPORTUNITIES AND CHALLENGES[1]

Tamim Younos, Raymond de Leon, and Christine Lewicki[2]

ABSTRACT: The objective of this article is to open a dialogue on integrating service-learning into community based watershed management programs and to discuss opportunities and challenges that a service-learning program presents to universities and communities. The article presents the concept and definition of service-learning, and arguments concerning why institutions of higher education and university faculty and students should be involved with community based watershed management programs. The article describes a case study for developing a service-learning program for watershed management at Virginia Tech and discusses lessons learned from the case study. The paper concluded that to make a service-learning program sustainable, there should be a long term plan, regular and effective communication with the stakeholders, and some incentives for faculty and students for long term commitment to the community based watershed management programs.
(KEY TERMS: watershed management; service-learning; university/community partnership; experiential learning.)

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INTRODUCTION

Since the promulgation of the Clean Water Act (1972), significant progress has been made in improving our nation's water quality. This success has been achieved primarily through federal, state, and local regulations of point source discharges. However, serious water pollution problems still persist throughout the country. Many problems are caused by the cumulative effect of urban, agricultural, and other forms of nonpoint sources of pollution. The nonpoint source pollution problems are developing around the edges of government regulations, where federal policies and statutes are unable to reach (Randolph and Bauer 1999).

Over the past decade, the U.S. Environmental Protection Agency (USEPA) has been promoting the adoption of a watershed approach as a means to more comprehensively address aquatic resource protection and restoration (e.g., USEPA, 1995a, 1995b, 1996). One of the core principles of the watershed approach is community involvement so that the people who depend upon the natural resources within the watersheds are well informed of, and participate in, planning and implementation activities. These community based efforts have many and diverse needs for scientific knowledge and technical skills. Many communities, however, do not have the required resources to implement an effective watershed management program.

In recent years, there has been a growing interest in and support for increasing the role of universities and colleges in community based watershed management applications (Lewicki and Younos, 2001). University resources (faculty, students, and in-kind support) can contribute knowledge, technical support, and skilled personnel to aid and enhance watershed management programs. An effective university community partnership can be established by integrating service-learning into community based watershed management. The objective of this article is to open a dialogue on integrating service-learning into community based watershed management programs and to discuss opportunities and challenges that a service-learning program presents to universities and communities.

DEFINING SERVICE-LEARNING

Many terms have been used to describe the experiential nature of service-learning. These terms include collaborative learning, community based education, cooperative education, experiential education, field experiences, and internships (O'Grady, 2000; Wade, 2000). For the sake of brevity two definitions of service-learning are given below:

• 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 (Jacoby, 1996).

• Service-learning is a powerful pedagogy of engagement that extends beyond methods of teaching and learning, recognizing that democracy is a learned activity and that active participation in the life of a community is a bridge to citizenship. Service-learning has the potential to be a bridge to civic education as it surfaces a broader vision of an engaged campus. A campus that is centrally engaged in the life of its local communities reorients the core missions of academia – teaching, scholarship, and service – around community transformation (Heffernan, 2001).

Service-learning is different from other educational endeavors in that it combines community service with academic learning. The hyphen used in the phrase symbolizes the central role of reflection in the process of learning through experience (Eyler and Giles, 1999). This form of learning and pedagogy is rooted in experiential education, one that often does not happen within the confines of a classroom, a discipline, or a campus. It involves a strong partnership between an institution and community that enables students to apply what they have learned in the classroom to practical problems within the community.

Past studies have shown that integration of service-learning into academic teaching can benefit students and their learning in ways that other pedagogies do not (Jacoby, 1996). Jacoby found that service-learning benefits a student in many ways: develops the habit of critical reflection; deepens understanding of course content; builds a bridge between theory and practice; brings insight to issues underlying social problems; increases sense of social responsibility; enhances cognitive, personal, and spiritual development; increases awareness and understanding of human differences and commonality; and sharpens abilities to solve problems creatively and to work collaboratively.

THE CASE FOR WATERSHED MANAGEMENT IN A SERVICE-LEARNING ENVIRONMENT

Higher education can provide an opportunity to engage students in a learning environment that can fulfill the responsibility of educating while serving the community through service-learning. As such, service-learning has the ability to educate future planning, policy, and science professionals while providing technical support and expertise to community based watershed activities. Watershed management is inherently a multidisciplinary and multijurisdictional approach that reflects public and private sectors' efforts to address watershed issues through a collaborative approach. Incorporating university knowledge into community based watershed activities could make a tremendous contribution to this collaborative effort while enriching educational programs and improving our nation's water resources.

Why should institutions of higher education support community based watershed management efforts? The answer lies in the history of public service that is an integral part of many universities' missions. Land-grant colleges were established in the United States under the provisions of the Morrill Acts (also known as Land-Grant Acts) of 1862 and 1890 with a major goal to educate and to serve people. For example, *Ut Prosim* "That I may serve,", the motto of Virginia Tech, a land-grant university, is shared with other land-grant universities and many private colleges across the nation. In addition to public service, water resources professionals in universities are responsible for educating future water resources professionals and for the "incorporation of new tools and ideas into the education and training programs of their institutions to produce better prepared and more effective graduates" (UCOWR, 1998). These two responsibilities, public service and innovative education and training of future water resources professionals, can come together through service-learning programs in which faculty and students provide socially relevant research and expertise to community based watershed efforts.

Local watershed practitioners recognize the value that students and faculty can bring to the table. For example, the No. 1 recommendation that emerged from the first Eastern Coal Region Watershed Roundtable (convened June 2000, in Shepherdstown, West Virginia) was to promote integrating university knowledge, through service-learning, into local watershed partnerships. In another example, delegates to the National Watershed Forum (convened June 2001, in Arlington, Virginia) recommended that universities establish collaborative education programs that address local watershed issues, assist community

volunteers with monitoring, data collection, and analysis; and provide future water resources professionals with training in facilitation techniques so they can be effective in getting diverse partners to work collaboratively to solve complex aquatic resources issues.

Community based watershed groups are not the only ones that stand to gain from university service-learning programs. Service-learning programs that support local watershed efforts can provide students with a learning laboratory to experience first hand the challenges and complexities of today's water resource problems in a multidisciplinary environment.

There are advantages for water resources faculty to be involved with community based watershed management programs and service-learning:

• Owing to the multidisciplinary nature of watershed management issues, the faculty will see the necessity for collaboration with other disciplines. This may result in breaking down some of the on-campus disciplinary barriers that are inherent between departments such as engineering and biological sciences.
• The faculty will be in a better position to compete for grants from foundations and government agencies, some of whom increasingly require a collaborative approach to watershed management.
• It can be personally and professionally rewarding to assist communities that need and value university faculty's scientific knowledge and technical skills.

Many students will appreciate the service-learning experience as it allows them to better understand how their classroom learning applies to real world problems. Some past service-learners have made the following comments (Walker *et al.*, 2001):

• "Topics ranging from community politics to environmental law to scientific analysis of water were studied, giving me an incredible breadth of exposure to the environmental field."
• "It was enlightening to see how politics, community organization, environmental law, and scientific knowledge relate in the scenario of solving environmental problems."
• "I have learned that knowledge is not always blurted out, but is reserved and quiet. I have learned to let others lead the conversation, so as not to offend the ideas and knowledge of other concerned parties. I have also learned the importance of being a good listener."
• "Being able to have some input into the improvement of someone else's corner of the world, no matter how small, is a very unique situation. The feeling of gratitude that is felt when a community member expresses his or her thanks for the job that you are doing cannot be put into words."

CASE STUDY: SERVICE-LEARNING WATERSHED MANAGEMENT PROGRAM

A case study for developing a service-learning program for watershed management was initiated to examine the potential and challenges of such a program. The model study was conducted as a collaborative effort between the Virginia Water Resources Research Center and the Service-Learning Center at Virginia Tech (R. de Leon, 2002, unpublished paper, M.S. Thesis, Virginia Polytechnic Institute and State University, Blacksburg, Virginia). The study consisted of a stream corridor assessment and database management system. The service-learning project was a component of the Stroubles Creek Watershed Initiative that uses the creek and its watershed for research, education, and outreach purposes. The university campus is located within the Stroubles Creek watershed.

A graduate student served as the project coordinator and supervised four undergraduates who were assigned as team leaders. Over a period of two semesters, eight service-learners, 26 volunteers and five faculty members participated in the program. All participants received appropriate training before participating in activities. Student service-learners came from several disciplines, including urban affairs and planning, environmental science, biology, fisheries and wildlife sciences, civil and environmental engineering, computer science, and forestry. The service-learning assignment for each participant was designed to supplement the student's existing knowledge and to allow the student to learn skills and technologies from other participants.

A major goal of a service-learning program is to provide opportunities for student to reflect on their experiences. Reflection can take on many forms: oral presentation, written reports, group discussions, and forum presentations. This also provides opportunity for the peers, project leaders, and the community to give feedback to the project. On a weekly basis throughout the project, leaders met with the service-learners individually and as a group to discuss their progress, concerns, and to reflect upon what they had experienced. Service-learners were required to write a summary report after each project describing their perspective of the project, their progress, and any concerns they may have had. Service-learners were also asked to participate in workshops, forums, and a stakeholder summit to present their findings and experiences to their peers, the university community,

and watershed stakeholders. These oral presentations and the questions that followed provided service-learners with structured opportunities to reflect critically on their service experiences.

LESSONS FROM THE CASE STUDY

Feedback from service-learners conveyed that students gained valuable experience throughout the project. Many students stated that their service-learning experience made learning more relevant to real life issues. Students found that they were able to apply what they had learned in the class out in the field and take back their field experiences to the classroom. They learned new skills, and improved existing skills in communication, team building, leadership, organization and technical areas (i.e., technical writing, database development, and geospatial technology applications). Students felt that they were making a meaningful contribution by serving the community to improve the stream's health. They perceived that their work and time was utilized well.

Meeting specific objectives of the watershed initiative and feedback from service-learners indicated that overall the project was successful. Service-learners completed the stream corridor assessment and created a database for the project. Nevertheless, project leaders discovered several issues that need to be addressed to make a watershed management service-learning program sustainable. These issues are described below.

Time Management

The major challenge faced by many service-learners was time management. The project coordinator and service-learning leaders reported the difficulty of finding time to plan and implement activities during the school week. Therefore, many time oriented, service-learning activities were conducted on weekends to work around student schedules and to encourage more students to participate in the activities. Project design and planning must also consider a school's schedule, such as breaks, mid-term exams, inclement weather, etc.

Long Term Commitment by Students and Faculty

Long term planning is the key to sustaining a watershed based, service-learning project. Because monitoring and other watershed activities typically continue for several years, service-learning projects and programs to meet the demands of watershed activities require an equivalent long term commitment by students and faculty members. Most projects in the Stroubles Creek Initiative last more than one semester and require a considerable amount of dedication by students to work on the projects. Many service-learners involved in the Initiative desired to partake in the project for one semester only. Projects given to such service-learners must be designed so that they are achievable within a semester. In projects to be completed within a few semesters, new service-learners must be regularly trained. Providing opportunities for students to receive credit (both partial and full) or wages for their work was found to be a good incentive for students to continue with the program over a longer period of time. Students who have received credit or wages for their work on the Initiative have often stayed involved for more than one semester.

It was also difficult to have an interdisciplinary faculty team stay involved with the project. Some of the barriers to faculty involvement are lack of time, not fully understanding the concept and benefits of service-learning, skepticism of the role of service-learning in teaching and student learning, and lack of recognition in the validity of service-learning for promotion and tenure considerations. Project leaders offered one workshop to faculty on developing service-learning programs for interdisciplinary watershed management. Such efforts need to occur regularly through forums and workshops to promote service-learning as a legitimate teaching and learning tool in watershed management.

Strengthening Stakeholder Participation

Watershed stakeholder input is an essential component of any community based service-learning program. It is critical that the needs and concerns of the stakeholders are heard and incorporated during the development of the program. In the Stroubles Creek Initiative, this meant working more closely with town planning and engineering departments, town and county planning commission, business owners, land owners, and others. The Initiative did provide several ways for the stakeholders to get involved with the program. Information on the Initiative projects was advertised throughout the community via media, letters, flyers, the Stroubles Creek Watershed Initiative website, at town council meetings, and through electronic mailing. The community was always invited to participate in the workshops and forums that provided opportunities for open discussions. To sustain the

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stakeholder interest, such activities must be held regularly. Information transfer to stakeholders has the added benefit of providing a learning opportunity to some students to improve their communication skills.

Evaluate the Service-Learning Program

Evaluation is a key component of a service-learning program and should consider both learning and service components of the program. Evaluation provides opportunity for the project leaders to assess the learning experiences of service-learners as well as the program effectiveness to meet watershed management goals. Project evaluation should be conducted on a regular basis to assure that the project meets overall service-learning objectives.

CONCLUSION

Incorporating university knowledge into community based watershed activities could make a tremendous contribution to collaborative watershed management efforts while enriching educational programs and improving the quality of water resources. However, to make a service-learning program sustainable, there should be a long term plan, regular and effective communication with the stakeholders, and some incentives for faculty and students for long term commitment to the community based watershed management programs.

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