Promoting Civic Involvement through Project-Based Learning? Worcester Polytechnic Institute's Interactive Qualifying Projects and the Worcester Community Project Center

Rob Krueger, Ph.D., Lance Schachterle, Ph.D.
Worcester Polytechnic Institute, Worcester, Massachusetts 01609

Introduction:

Today's American political culture seems to be hopelessly swamped by apathy. In 1996, President Clinton won a majority of votes from a minority of the population (39%). In our hometown of Worcester, Massachusetts, last fall's mayor's race was won with 17,909 votes, representing 27% of the total population. Numerous organizations are working to combat this state of affairs: Jesse Jackson, Labor Unions, feminists and Pat Robertson all seek to increase their voting blocks through voter registration drives. But is this apathy a cause or a symptom? More frightening are Putnam's (2000) findings that Americans are participating less and less in civic organizations; that our sense of civic responsibility is in a state of free-fall. Americans are not showing up at the polls because they do not have the civic connections they once had and therefore their interest in and knowledge to express their political demands continue to atrophy (cf. Barber and Battistoni 1993).

College campuses, once fomenting with student activism, are faring only marginally better. It is true that students recently became outraged thanks to companies like Nike and the Gap, and once esoteric acronyms like GATT and WTO. Harvard students no longer buy sweatshirts made in sweatshops, the Gap changed its labor practices at oversees plants to placate its outraged customer base, and the Seattle round of the WTO ended in failure. College students have shown a penchant to educate themselves around macro issues like globalization. What about local issues? Interest in macro controversies seems to be ephemeral, at best. Responsible civic engagement requires a sustained and determined effort, not a mere catharsis coming from the pervasive inequities of global capitalism. Do students have the ability to engage in local public affairs? If Barber and Battistoni are correct about expression, how do we "educate" current and future generations to be engaged citizens?

Service learning has been advocated widely as a method for advancing civic awareness and citizen responsibility among college students (Hepburn et al. 2000; Hunter and Brisbin 2000; Ehrlich 1999; Neimi et al. 1999; Battistoni 1997; Campus Compact 1994; Schumer 1994). Hunter and Brisbin (2000) define service learning as "a form of experimental education that combines structured opportunities for learning academic skills, reflection on the normative dimensions of civic life, and experimental activity that addresses community needs or assists

individuals, families and communities in need" (p.1). Some authors claim that service learning provides students with the tools and the ability to express themselves effectively in public affairs because it involves schools and students "sympathetically and productively" with the communities they serve (Eyler and Giles 1999, p. 7-19 cited in Hunter and Brisbin 2000, p. 1). Furthermore, service learning activities require students to develop skills critical to civic engagement: critical thinking, linking theory and practice, problem solving techniques and interpersonal skills.

Such civic engagement is important specifically to engineering students and educators. In reformulating the fundamental criteria for engineering accreditation in terms of student outcomes, the Accreditation Board of Engineering and Technology (ABET) replaced sets of courses passed with sets of learning outcomes achieved and assessed. In other words, programs seeking ABET accreditation must now demonstrate that their graduating students can function as beginning professionals in eleven different areas of performance—not just pass courses. At least four of these new performance outcomes in Engineering Criteria (EC) 2000, Criterion 3, Program Outcomes and Assessment, can be achieved through civic service learning:

1. an understanding of professional and civic engagement
2. an ability of communicate effectively
3. the broad education necessary to understand the impact of engineering solutions in a global and societal context
4. a knowledge of contemporary issues.

The program we are describing provides abundant opportunities for engineering students to achieve these outcomes. Our challenge as educators at WPI is to make the students fully conscious of how these four outcomes impact them since they are embedded within project activity rather than being free-standing topics within traditional courses.

Evolving independently of the service learning movement was an initiative within Worcester Polytechnic Institute to promote project-based degree requirements. Perhaps the most innovative of these requirements is the Interactive Qualifying Project or "IQP." The pedagogical objective of this interdisciplinary project was, and remains, to provide students with an interdisciplinary experience in solving public policy related problems. The economic development office in Worcester, Massachusetts, for example, has been seeking to place an art college in the city's downtown. Once they identified an interested school, the Massachusetts College of Art, they enlisted the help of WPI students to measure the demand for a Master of Fine Arts degree in Central Massachusetts. WPI has an extensive network of project centers around the world that provide the foundation for the interdisciplinary experience. Because of the success of these centers as well as the financial limitations and preferences of some students, WPI established a project center in Worcester last year. The idea behind the Worcester Community Project Center (WCPC) is to provide an off-campus experience for students who want or need to remain in Worcester to complete their interdisciplinary projects. The WCPC added another layer to this project, however. The stated goal of the WCPC is:

To assist organizations in Worcester in addressing and solving policy issues where contributions from WPI's scientifically-oriented students and faculty are especially helpful. *Through carrying out projects involving both technological and societal dimensions with Worcester sponsors, WPI students will develop a better understanding of how their professional practice will affect community structures and values.* (emphasis ours)

The second part of this goal statement renders explicit a leap in thinking about the relationship between the project, WPI students, and the community they live in during their college careers. A founding principle of the WCPC is to promote civic mindedness among its students. Just over a year old, the WCPC is still in its infancy. So far the WCPC has been successful in attracting students who wish to stay in Worcester for their interdisciplinary activity. Can it appeal to a broader base of students who seek an education in community involvement? Moreover, can it transform politically disengaged students into embrace a sense of civic responsibility? If so, how?

The service learning movement and WPI's project centers have evolved simultaneously. Despite this coincidence, the two initiatives have never engaged one another in a dialogue. This paper serves as an initial effort to spark an ongoing conversation between these two approaches for promoting civic education among college students. We divided our paper into five parts. First, we discuss the basic tenets of service learning in more detail. Second, we describe the interdisciplinary project and WPI's global network of project centers, with an eye toward the WCPC. Next we will attempt to synthesize the goals of each. Fourth, we present data collected from student focus groups to answer the question: "What would attract students to a program that links civic education to the IQP. Finally, we will make a few concluding remarks.

Service Learning: The Main Tenets

Service or experiential learning has been a part of the American educational system, off and on, for nearly 100 years. Its most recent incarnation came about in the mid-1980s when a study, commissioned by the Carnegie Foundation, reported that the current educational crisis came not from declining test scores, but a failure to provide an education in citizenship (Newman 1985). The report was provocative and prompted president of Brown University to organize other university presidents in an association interested in promoting a civic education, the result was Campus Compact.

Proponents of service learning ground their approach in the writings of John Dewey (1916; 1938) who believed that academic experience should not be isolated from life experience and that formal education should foster personal development through exposure to the community. For Dewey, meaningful community involvement will stimulate an interest in school-related subjects. By extension, the student with a "civic education" will have the skills needed to reproduce democratic norms. Service learning seeks to fulfill these dual needs by promoting student participation in public affairs, thereby creating competent actors who will participate in civic affairs. For Ehrlich (1999), who was a progenitor of modern service learning, "civic

learning involves students coming to understand the democratic processes of a community, the problems it faces, the richness of its diversity, the need for individual commitments of time and energy to enhance community life, and, most of all, the importance of working collaboratively to resolve community concerns" (p. 246).

Gregory et al. (2001) provide an example of service learning in a research methods course. The course, entitled Art, Community and Politics, sought to teach the principles of social research to undergraduates at Chapman University in California. Rather than teach research methods in the abstract, the instructors had students evaluate efforts by the city of Santa Ana, California, to promote community development via the arts. The objective of the course was to have the students assess "what impact the arts had on the community development and the city of Santa Ana" (p. 1). The overall learning experience, the instructors hoped, would teach students research methods, make a practical contribution to public life in the region, and have a unique learning experience.

Service learning is adaptable to many types of course offerings and thus does not lend itself to a rigid performance model. Some common threads in service learning are notable, however. Hepburn et al. (2000) remarks that:

> [s]ervice learning in college is structured into the curriculum to relate specifically to course objectives. Experiences are planned to enhance reading, lectures, and classroom discussion. It involves students in reflection on their service experiences, either in writing or in discussions or both…Research indicates that the most effective service learning programs are those that:
>
> 1) have well-articulated goals to the course content,
> 2) are long enough in duration for students to develop communication and working relationships with people in the agencies where they volunteer and to feel some proprietorship for the projects they work on, and;
> 3) provide ample opportunities for extensive reflection on the community experience and public policy so that it relates to accompanying political science coursework (p. 3).

Having presented a background in service learning and the goals on which it rests, we now turn to WPI's project-based learning program, specifically focusing on the interdisciplinary project.

WPI's Project-Based Learning Approach

Twenty-five years ago WPI included project-based learning as a major component of the University's degree requirement. Three project based degree requirements were created: a capstone experience in the humanities and arts, the major, and interdisciplinary project. Of the

three projects, the interdisciplinary one was perhaps the most innovative of the three project requirements. The pedagogical objective of the IQP is to provide an interdisciplinary experience in solving policy-oriented problems at the nexus of techno-scientific and social domains. Project Center Directors solicit projects from public agencies, private companies and educational institutions and non-profit organizations. The projects are not just "made up" for WPI students. Rather they are important to the sponsoring agency. For example, the Worcester Information/ Technology Project, a private agency working toward public goals in Worcester, commissioned a project to determine the resource needs of high-tech companies and the human resource supply Worcester offers. Through this project students collected valuable data for the agency and provided a report that, in the end, interested several agencies.

Another attribute of the Interactive Qualifying Project, which relates well to EC 2000, is its team orientation. Students work in teams (usually 3-4 students per team) based upon their project preferences, which are determined at the beginning of the first term. Typically, the teams engage in a preparation period (term one) and a project period (term two), which span a total of four months (WPI is on a term system, with four terms per year). While the preparation period is completed on-campus, projects are primarily completed at off-campus project centers. By conducting these projects at locations off campus, the interdisciplinary project proved to be an ideal opportunity for students to have meaningful experiences beyond the gated community of the college campus. Initially, Washington, DC was the only project center. A few years later a center was established in London, England. Today, WPI has a network of project centers from Bangkok, Thailand, to Venice, Italy, and from Zurich, Switzerland, to Windhoek, Namibia. The number of students attending them underscores the success of the off-campus project centers. Approximately 60% of WPI students go to off-campus centers to complete their IQPs, giving WPI, by far, the largest number of engineering students who study abroad—thus providing many learning opportunities for EC 2000 Criterion 3h. The off-campus centers have proved so effective over the years that last year WPI established a new project center, the Worcester Community Project Center (WCPC).

The Preparation Period

A social science research methods class and a "tutorial" are the two main components in the interdisciplinary preparation period. The social science course provides students with the basic skills and knowledge they will need to complete their projects. For the "tutorial" is a weekly team meeting with the course instructor and project advisor where project details are discussed. Thus the class provides general information about social science research methods and the tutorials provides the faculty and the student teams a venue to discuss project details.

The social science course covers three main themes that cross all project centers: 1) social science research and design and methodology, 2) host community orientation, and 3) a project proposal that details the pertinent literature(s) impinging on their problems, their methods of data collection and analysis, and the possible social implications of their work. Students take a preparation course that is designed for their project center. Because each center has is own unique social, economic, and cultural characteristics that inform its projects, each course adapts

the basic model described above to its projects. The Venice Project Center, for example, is heavy in Geographic Information System technology. Other centers, such as Worcester, Zurich, and London, have projects that lend themselves to surveys and interviews. Accordingly, all students at a given project center take the same prep course; students attending different project centers are not commingled for the prep-course. The tutorials are broken down further still, into individual team meetings. Each team meets with their faculty advisors once a week to discuss their proposal's progress of the proposal and issues unique to their projects.

The preparation period lasts for one seven week term. During this time students are immersed in familiarizing themselves with their projects: proposal writing, the culture and language (if necessary) of their project site, and social scientific thinking. The idea of these activities is to convey the notion that all technological problems are embedded in a social context. Furthermore, these contexts remain dynamic throughout time and across space. By the end of the proposal period the students should have well-crafted proposal that sets out how they will execute their research the following term.

The WCPC Preparation Period

The WCPC closely follows the general themes of the preparation period described above. The course provides students a background in social science research methods and design aimed at the Worcester civic environment. WPI students are fairly naïve about the socio-cultural aspects of the scientific method so the professor begins by presenting and problematizing basic concepts from the philosophy of science. The purpose is to illustrate just how deeply our ideas about "reality" are affected by social norms and values. The portmanteau idea is to convey to students that their research activities, now and in the future, are not pure, but influenced by their clients, their education, the current state of knowledge in their fields, and so forth. This assertion, however, does not mean imply that we cannot discover things about the world. Rather, we just have to properly circumscribe our findings based upon our limitations (e.g., financial or political). Students then begin several weeks on social science research design and methodology. During this segment of the course they are forced to think critically about their sponsors' questions/problems, what kind of data their sponsors want, their project's goals and objectives, and what kind of methods will marry these issues.

Through literature reviews they must also survey the current state of knowledge that impinges on their respective topics. A recent team analyzing the Worcester business permitting process, for example, had to develop a literature review on topics ranging from local economic development, the role of the government in economic affairs, to the particulars of business permitting from a planning perspective. In other words, students must grapple with a variety of issues—social, economic, scientific and political—and pin them down well enough to produce a coherent and respectable research proposal.

During the preparation period WCPC students are also exposed to the Worcester community and issues facing it. Guest speakers representing a variety of interests come to class meetings to discuss current local issues. In addition, a local professor of history who is also a former

Worcester mayor leads the students on a walking tour through the city to point out its industrial and cultural artifacts. Finally, the students are required to complete a "Worcester history and culture project." Students are given topics that require them to go to local historical and art museums to collect primary data in response to questions such as:

Examine immigration trends in Worcester over the past 100 years.
- Where did immigrants come from primarily?
- What were the local settlement patterns? (maps would be useful here).
- What policies and events influenced immigration patterns?

- Divide your research into two analytical periods, before 1950 and after 1950. Provide an historical account of the Worcester Art Museum's (WAM) development and growth.
- How did the museum get started?
- Why did Worcester's leaders perceive a need for an art museum?
- What role does the WAM play in the community? What role should it play? Is it a "community" institution?
- How does the WAM project its role in the community?

Each element of the preparation period challenges students to think critically about the knowledge claims they produce and are exposed to. In addition, it seeks to raise awareness of the influence that "local environment" has on problem definition and feasible solutions.

The Project Period

Following the preparation period is project implementation. For seven weeks students will carry out their research and write up their final reports to their sponsors. During this time the students work very closely with their project sponsors and the contacts they develop for the research. Like the preparation period, this is a very rigorous few weeks. Typically, students will spend 50+ hours per week conducting interviews, preparing and disseminating surveys, otherwise collecting data and writing up their report. These projects result in professional-level reports proposing solutions to the agency's problem that must balance what is financially, socially and technically acceptable. Many times, such as a recent study that evaluated the demand for an art school prepared for Worcester's Executive Office of Economic Development, students have the opportunity to see the results of their labor. In this particular case, once the sponsor received the report it was immediately taken to the Massachusetts College of Art as supporting evidence for the viability of such a school in Downtown Worcester (Ganchi and Mendenhall 2001). The Massachusetts College of Arts Report also exhibits a single project that is part of a much broader redevelopment vision. In other words, future teams will build from this report and the connections of goodwill made from to further promote opportunity and sustainable economic development in Worcester on a broader scale than specific projects.

We have now presented both the service learning model and the WPI model. Where do these approaches overlap? How do they complement each other? We will discuss some opportunities for cross-fertilization in our next section.

Toward a Synthesis

The similarity between the service learning approach and WPI's Interactive Qualifying Project is uncanny (see Figure 1). The main difference between the two approaches appears to be under the categories of "reflection" and related projects (versus unrelated or piecemeal). One of the major tenets of the service learning approach is that students must be provided ample opportunity to reflect on their experience. Studies of student learning show that built in opportunities to reflect on field experiences by means of written journals or class discussion help students learn about the social, political and economic conditions around their work (Hepburn et al. 2000; Eyler and Giles 1997). Here the project experience falls short. While there is ample opportunity to reflect on team dynamics through weekly journals during the preparation phase, as of this publication no effort is made to promote reflection on the social, political, or economic conditions influencing their projects. The implementation phase requires no structured reflection.

Figure 1.
Comparison of Service Learning Approach and the WPI Method.

	Service Learning Approach	**Interactive Qualifying Project (IQP)**	**ABET Criterion 3**
Related to course objectives/ well-articulated goals	**X**	**X**	
Practical experience relates to classroom experience	**X**	**X**	F, H, I
Adequate time for reflection	**X**	**?**	
Adequate duration to develop relationships/ ownership of projects	**X**	**X**	F, G
Related projects that seek to grow to greater than the sum of their parts	**??**	**X**	F, G, H, I

In terms of relating a series of projects, our limited review of the literature revealed no evidence of service learning instructors seeking to link projects. This is in no way a critique of service learning. Many professors teach several courses per year and often time some courses

only taught once a year or even every other year. In fact, related or ongoing projects are present only at a few of the WPI project centers, including the WCPC. The benefit of related and ongoing projects is the attraction to students. WPI students enjoy seeing the fruits of their labor beyond their own "discreet" efforts. Our research shows that WPI students have a strong desire to contribute to Worcester or a community, but want to see their efforts go beyond what they can produce in a 14-week period. This leads us to our penultimate section on attracting students to the WCPC.

Civic Engagement and the WCPC

Given the number of opportunities to complete their projects at centers around the world, why would students want to remain in Worcester? We have mentioned a few examples (e.g., costs, disruption, etc.). But can the WCPC compete with global centers because it offers its own unique opportunities? Can the WCPC really be something beyond what the other centers are not? Our initial data suggests it can.[1] Good students are interested in completing their project in their own communities. More importantly, they are interested in completing projects that help the community. One student remarked: "Completing the project is beyond just getting a grade. It's about doing something useful. If I wanted to do it for just a grade than I might as well go somewhere else for my project."

The difficulty comes from operationalizing the concept of "useful." Throughout the interview many students spontaneously used the term useful, or "to help" the community—to "give back" to it. Arguably, all of the projects are useful to their sponsors; they are designed to be that way, to address concrete policy problems. This notion, however, is somewhat opaque to the students. One student remarked "the best projects are those that are tangible, where we can see the results of our work and the work of others." Does the art school discussed above have to actually be built for students to think their efforts lead to a tangible benefit to the community? Probably not. The reaction of the project's sponsors was probably enough to make it "useful." For example, the Executive Office of Economic Development included the students' report directly into the package they prepared for the art school's site selection team. But not all projects will have this tangible of an end, and this one area where the service learning approach can provide the WCPC some guidance.

Going back to Barber and Battistoni's (1993) sentiment that Americans do not have the civic connections they once had and therefore their interest and knowledge to express their political demands continues to atrophy, can we really expect these students to understand the implications of their work? Perhaps what they are need the tools and venue to reflect on their social contributions. This is where the practice of reflection might be useful.

Conclusion

---

[1] The authors conducted focused group interviews in December of 2001. The focused group interviews were recorded and analyzed in late December. An interview schedule is available upon request.

It is hoped that the Interactive Qualifying Project can act as a vehicle to increase civic involvement in students. By promoting civic involvement in students, we further hope to curb American apathy toward civic institutions. This paper represents a first step to advance a conversation between WPI's project-based approach and service learning. In addition, we sought to incorporate the ABET program outcomes into our analysis. Specifically, we sought to compare the service learning approach to that of WPI and look at some preliminary focus group data. We found that WPI and the service learning approaches are very similar. Service learning, however, has a "reflection" requirement. WPI's interdisciplinary project approach, on the other hand, puts together a set of related projects to allow students to see their contribution both immediately and as they evolve over time. Both of these approaches seem to fulfill Criterion Three, the Program Outcomes Assessment, put forth by ABET. Our efforts to collect more data are ongoing. We hope to add to this first effort at linking service learning, to projects, and the specific outcomes identified by ABET to complete the circle of learning.

References

Barber, Benjamin and Richard Battistoni. 1993. A Season of Service: Introducing service learning to a liberal arts curriculum. *PS: Political Science and Politics* 26 (June): 235-240, 62.

Battistoni, Richard. 1997. Service Learning and Democratic Citizenship. *Theory into Practice* 36: 150-156.

Campus Compact. 1994. Mapping the Geography of Service on a College Campus. Providence: Brown University.

Dewey, John. 1916. *Democracy and Education: An Introduction to a Philosophy of Education*. New York: MacMillan.

-----------. 1938. *Experience and Education*. New York: MacMillan.

Ehrlich, Thomas. 1999. Civic Education: Lessons learned. *PS: Political Science and Politics* 32 (June): 245-249.

Ganchi, Anthony and Susan Mendenhall. 2001. Assessing the Demand for and Interest in an Art School in Downtown Worcester, Massachusetts. Worcester, Mass: WPI.

Gregory, Jill, Mark Mattern and Shari Mitchell. 2001. From Ivory Tower to Urban Street: Using the classroom as a community research and development tool. *PS: Political Science and Politics* 34(March): 119-124.

Hepburn, Mary. 2000. Service Learning in College Political Science: Queries and commentary. *PS: Political Science and Politics* 33(September): 617-637.

Hunter, Susan and Richard Brisbin. 2000. The Impact of Service Learning on Democratic and Civic Values. *PS: Political Science and Politics* 33 (September): 623-633.

Janet Eyler and Giles, Dwight. 1997. The Importance of Program Quality on Service Learning. In *Service Learning: Applications from Research* Alan Waterman (ed). Mahwah, NJ: Lawrence Erlbaum.

Newman, Frank. 1985. *Higher Education and the American Resurgence*. Princeton: Carnegie Foundation for the Advancement of Teaching.

Niemi, Richard, Mary Hepburn, and Chris Chapman. 2000. Community Service by High School Students: A cure for civic ills? *Political Behavior* 22: 45-69.

Putnam, Robert. 2000. *Bowling alone: the collapse and revival of American community*. New York: Simon and Schuster.

Schumer, Robert. 1994. Community-Based Learning: Humanizing Education. *Journal of Adolescence* 17: 357-367.