

The Building Bridges Seminar

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abstract

Through participation in local public policy issues in local committees, faculty at the University of Evansville became aware of the need for our civil engineering graduates to become savvy about issues facing engineering projects outside of the classroom. In particular, we wanted our students to realize that civil engineers have a special relationship with the public due to the nature of our designs and the impact that they have on a city, a county, a state, a region, and a nation. Because our work is often heavily influenced by agencies, boards, committees and sometimes by the general public, we created a special ASCE seminar series in Fall and Spring of Academic Year 2002-2003. In these seminars civil engineering students from all four years will talk to leaders in the community who affect the public policies that affect our designs. Students in the Spring semester will then team up in small groups to follow the proceedings of these various agencies and the projects that they oversee over an extended period of time and report back on their progress (or lack thereof) in subsequent ASCE meetings. This paper will outline the structure of the seminar series and describe the assessment of the seminar relative to our program objectives. The assessment will show the impact of the seminar series on the students' attitude on public issues and the response of the community to this seminar that hopes to build bridges between the university and the community.

introduction

In the summer of 2002, the second author started to develop an idea for involving civil engineering students in the public policy process as it impacts civil engineering work. Specifically, the objectives were to force civil engineering students to get involved with the political system, attend public meetings, and see what nontechnical obstacles will stand in their way once in practice. Realizing that some problems that civil engineers address (*e.g.*, congestion, pollution, new roadway developments, flooding issues, *etc.*) are chronic and that the solutions to these problems take time to be accepted by a community and to be implemented, the long term objectives were to have students follow public projects throughout their four years in the civil engineering program.

From this starting point, civil engineering faculty took steps to implement the Building Bridges Seminar at the University of Evansville during Academic Year 2002-2003, a special seminar series

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sponsored through the student chapter of the American Society of Civil Engineers for freshmen, sophomores, juniors, and seniors in our program. This paper presents a brief discussion of the need for such a seminar series, how the seminar was implemented, how the seminar is being assessed, and a preliminary reading of some initial data from this assessment.

background

Civil engineering educators who are involved in the community either as concerned citizens or as practitioners of the profession can appreciate the need for civil engineers to have a broad outlook to realize projects in the public sphere. Anecdotally we hear it from employers who sometimes complain of deficiencies in the graduates of civil engineering programs. More formally, we also hear it from alumni who feel as one who wrote in response to an alumni survey asking for feedback on our program's educational objectives:

“I think an important issue which could be added to Objective 2 [dealing with professional practice issues] is the interaction of design professionals and the public. This interaction is becoming more important because design engineers are further being challenged and expected by state and local agencies to ‘think beyond the pavement.’ Thus being able to efficiently communicate with the public to discover the needs and wants of a community being affected by a project is very important.”

The American Society of Civil Engineers recognizes that public involvement in what used to be a largely technical domain is now the norm: “Enhanced public awareness of technical issues is creating more informed inquiry by the public of the technical, environmental, societal, political, legal, aesthetic, and financial implications of projects.”¹ Indeed, this issue is cited when ASCE makes arguments for a policy statement regarding the need for graduate education for professional practice.

The Accreditation Board for Engineering and Technology weighs in on the subject of this interaction between the engineering and the public sector through Criterion 3 (h): “Engineering programs must demonstrate that their graduates have the broad education necessary to understand the impact of engineering solutions in a global and societal context.”² In response, the civil engineering program at UE has as one of its published program outcomes the following: “Students will understand the importance of involving the public in civil engineering projects.”

A survey of the literature reveals that other civil engineering programs have recognized the need for public-minded students. McCuen³ has implemented a one-credit course open to students in the Engineering Honors Program at the University of Maryland focusing primarily on the issue of leadership. The course has one lecture on public policy-making and uses papers by Tribe⁴ and Schott⁵ as foundational readings. Cleary and Sun⁶ at Rowan University describe a senior level course that addresses many professional practice issues, among them the regulatory agencies that impact the work of a civil engineer.

Although there are some precedents, the work at the University of Evansville differs in tone, scope, and implementation. The tone is more informal and interactive. The scope and reach

encompasses all students (not just seniors), allowing them to follow a sustained dialog with the community not through just one lecture but over their four years. The implementation is discussed in the next section.

the blueprint

In recent years the student chapter of ASCE at UE has become more and more active so it seemed logical to choose ASCE chapter meetings as venues for the seminar series. In addition to the seminar, the chapter could conduct some business (and have fun) knowing most all students from the civil engineering program would be in attendance.

Because the idea was formulated during the summer it was not possible to create a formal seminar course and enroll students in it. Many students already take the maximum of 18 hours, so putting even another hour into their schedule would have been burdensome. We agreed to make attendance at the seminars mandatory for classes in all four years of the curriculum that would cover most all students except for a few out-of-sequence students and those on co-op. In the Fall the classes were: *Introduction to Engineering* (freshmen), *Surveying* (sophomores), *Construction Management* (juniors), and *Senior Design* (seniors). Because only two civil engineering faculty members were in charge of these four classes, it was relatively easy to incorporate the seminar in our syllabi, indicating the mandatory meeting times, seven Thursday evenings spread out over the Fall semester.

The Spring semester always presents problems, especially for the underclassmen because they may or may not be taught by any of the civil engineering faculty. In the Spring we chose to target the following courses: *Statics* (freshmen), *Material Science* (sophomores), *Transportation Engineering* (juniors), and *Senior Design* (seniors).

The first semester of the Building Bridges seminar would entail inviting outside speakers to discuss their experiences working on commissions and agencies that make decisions about civil engineering projects. The speakers could be either engineers or non-engineers, with the non-engineers being able to provide a perspective on the working relationships with engineers. The speakers included:

- John Schwartz, Voices for I-69, an advocacy group.
- John Stoll, County Engineer and Catherine Fanello, President of County Commission
- Brad Mills, Area Plan Commission
- Pat Keepes, Evansville City Engineer
- Mike Feltz, Chairperson of Transportation Committee of the Metropolitan Evansville Chamber of Commerce

In addition, students had time for organizing ASCE activities, attending public hearings for a major interstate project, and also planning for the Spring semester.

By having exposure to what the different agencies do, students could choose a specific agency to follow during the Spring semester. Several of these boards meet either just every month or every

other week so the requirement would not be burdensome. During the Fall semester we divided the forty three students in the civil engineering program into nine groups, each group being led by one of the nine CE seniors. In January we will have an organizational meeting for the ASCE student chapter and then start reconvening the groups to in March and April to have them give presentations on the issues they observed in the different meetings.

the “a” word

During the Fall semester our program had an accreditation visit by ABET so assessment was heavy in the air. By the middle of the semester we began thinking about ways to assess the Building Bridges seminar. Although not needed for the 2002 accreditation visit, we were following the spirit of continuous assessment for continuous improvement. We came up with the following draft instrument by the end of the semester:

Please answer the following questions using the following rating scale:

Strongly Disagree	Disagree	Agree	Strongly Agree
1	2	3	4

1. Politicians and government agencies have a significant impact on the design of civil engineering projects.
2. Civil engineers have no influence on political decisions affecting public works projects.
3. In today’s society, the location of infrastructure (highways, airports, water treatment plants, etc) is determined solely by the results of engineering design and analysis.
4. The political process is useless because nothing is ever accomplished at public policy meetings.
5. I want to be involved in the decision making process by working with agencies, commissions, and other public policy bodies.
6. The Building Bridges seminar series improved my attitude about being involved in the public policy process.

Because we came up with this instrument late in the semester, we could not administer it to all the students. However, to get a feel for the usefulness of these questions, we gave the questionnaire to freshmen in the *Introduction to Engineering* course as part of the final exam, with the explanation that they would get full credit as long as they answered honestly to each question. There were 14 students and all responded. The following table indicates how the students responded to the questions.

Table 1. Freshman response to the Building Bridges questionnaire. There were 14 students responding. Numbers indicate the range of student responses in the agreement scale.

Question	1 Strongly disagree	2	3	4 Strongly agree	AVG
1	0	0	5	9	3.6
2	3	11	0	0	1.8
3	5	7	2	0	1.8
4	4	9	1	0	1.8
5	0	2	8	4	3.1
6	0	4	7	3	2.9

Of all the student groups, perhaps it was most important to influence the attitudes of the freshmen early on in their studies, while they still contained the idealism (and naiveté) that we so love in young students. The results seem to indicate the seminar had a positive impact on their perception of civil engineering and the profession. In the future, it would be better to administer this questionnaire before being exposed to the seminar series in order to assess their preconceptions about the work of engineers.

Based on outside feedback, we may alter the instrument slightly in the future. However, we plan to administer a similar questionnaire to all of our CE students at the end of the Spring semester and determine if there might be differences in perceptions and attitudes among the various classes.

conclusion

At the time of this writing we had not yet had a chance to observe how the spring semester of Building Bridges has made an impact on the students. However, based on the observations of the Fall semester we are fairly pleased with the results. There were some complaints from students about an extra requirement and some students could be found in seminars working on homework. But at least from the freshman class we could see a positive impact. The seminar had fringe benefits, including providing yet another point of contact between underclassmen and upperclassmen and instilling a sense of pride in ASCE.

It is our intent to continue this seminar series to help students see the development of projects over a long time-span. While the goals of the seminar series may be worthy, realistically we know that the on-going success depends greatly on sustained student and faculty interest in an environment where the character of students change and there are many competing demands in a university.

In the future, the civil engineering students could jump into the actual public meetings much sooner, with many of them already familiar with what goes on in those meetings. We plan to hold a couple of introductory meetings, perhaps with panels of speakers as opposed to a single speaker per event. We found that one of the best seminars in the Fall was the meeting that included both

the county engineer as well as the president of the county commission. The interaction between the engineer and non-engineer was exactly what we wanted our students exposed to.

references

1. American Society of Civil Engineers. *Draft ASCE Policy Statement 465: First Professional Degree*. October 17, 1998.
2. Accreditation Board for Engineering and Technology. *Criteria for Accrediting Engineering Programs*. November 3, 2001.
3. McCuen, R. H. "A Course on Engineering Leadership." *Journal of Professional Issues in Engineering Education and Practice*. 125(3), 79-82. 1999.
4. Tribus, M. "The Engineer and Public Policy-Making." *IEEE Spectrum*. 14(4), 48-51. 1978.
5. Schott, R. L. "The Professions and Government: Engineering as a Case in Point." *Public Administration Review*. 38(2), 126-132. 1978.
6. Cleary, D. B. and Sun, C. C. "Course in Professional Practice Issues." *Journal of Professional Issues in Engineering Education and Practice*. 129(1), 52-57. 2003.

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