

**EXPERIENTIAL LEARNING via SERVICE TO THE COMMUNITY:
CITY - UNIVERSITY COLLABORATION**

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ABSTRACT

This paper focuses on an undertaking that involved both graduate and undergraduate students from the Construction Engineering Management Technology (CEMT) Program at Indiana University-Purdue University (IUPUI) in a New Product Review (NPR) process that was undertaken for the Department of Public Works (DPW) of the City of Indianapolis. Within the context of this program, CEMT students provided technical evaluation of new materials, technologies, and processes to the City through a University – Public Entity collaboration. The paper details how this process was implemented, what kind of reviews were conducted, and how has this undertaking impacted student learning and in which ways.

THE NEED

As the City of Indianapolis continuously updates or adds to its infrastructure, new materials, processes, and technologies (from here on called “products”) are frequently introduced to the City by various vendors. For the Department of Public Works these are often products that deal with sanitary sewer and storm water infrastructure systems. Previously the City’s product review process was facilitated by outside consultants but as the City grew DPW began to experience a need for help with the process from a non-partial third party for review and approval of new “products”. So, when they were presented with a system that would not only provide new “product” evaluation resulting in lower costs, shorter review times, and a number of other benefits but also help experiential student learning outside the classroom, they were happy to entertain the idea and thus the collaboration between the City and the university was born.

On July 1, 2009, IUPUI signed an agreement with the DPW of the city of Indianapolis to provide technical evaluation of new products and services via the “New Product Review ” process through the University’s Purdue School of Engineering and Technology. This process was another step in transforming the University from just an urban amenity to a real urban asset. In terms of work that was completed, this collaboration has benefited the City and the University in various ways. Most importantly, it has provided students with the opportunity to develop a wide range of skills through professional experience and experiential learning that will benefit them in the future.

The Indianapolis DPW maintains the public infrastructure, manages municipal solid waste collection and ensures a healthy, safe and natural environment. Indy's DPW is committed to providing efficient and effective high quality customer service to the citizens and visitors of Indianapolis.

The agreement between CEMT/IUPUI and the DPW represents an uncommon and exemplary collaboration. In view of the fact that most of the work is done by graduate and undergraduate students led by a faculty member, the NPR process has raised the "service learning" concept to a whole new level. It is well known that service learning has been one of the primary objectives of higher learning institutions for some time now. It has been implemented in various ways in diverse contexts in various academic institutions of higher education. We believe this totally new implementation really raises the bar. This undertaking has already provided our students with the opportunity to develop a wide range of skills through professional experience that will benefit them in the future in their respective careers. Overall, this unique service learning implementation is transforming the University from being just an urban amenity to a real urban asset, the basic tenet of service learning.

METHODOLOGY

Even though there are ample examples to University-Industry collaboration, there is a scarcity of examples for collaboration between a university and a public entity such as the DPW of Indianapolis. This type of collaboration is unique and only very few examples even come close as a literature search clearly indicated [Feinstein, 1977; Community-City-College Collaboration, 2004; York College; Univ. of Chicago, 2008; Penn Institute]. A similar concept is promoted by CEO's for Cities [geocities.org], a national network of urban leaders dedicated to building and sustaining the next generation of great American cities. In the new product review process (NPR), small teams of CEMT program graduate and undergraduate students perform a technical review of a new material, process, or technology (called the "product") seeking approval for adoption and possible utilization by the city of Indianapolis.

The NPR process starts with the formation of a student team ("team") composed of undergraduate and graduate students headed by a faculty member when a vendor seeks approval for a new "product." Upon depositing of funds by the Vendor to start the process, a student team is assembled. Each student "team" also has a student team leader that is charged with leading the team activities and ensuring the communication with the faculty- member-in-charge as needed. The team composition changes for each "product" to ensure experience on the part of students for as many different set of products as possible.

The vendor who is seeking approval for a "product" is then sent a number of forms, developed by the first author, to fill out and submit, together with all hardcopy or electronic documentation that pertain to the "product." The Vendor is then invited to make a formal presentation to the "team" and to the DPW employees related to the product to be reviewed.

The Vendor presentation is video-taped and the recording is stored as an electronic file together with everything else the Vendor submits.

The "team" then develops a draft report based on information and documentation provided by the vendor presentation and all vendor submissions related to the "product". All references pertaining to

use of the product in other cities, submitted by the vendor are also contacted. Input from such references is obtained, as needed, in addition to contacting the vendor with questions that arise during the development of the draft report.

The draft report is evaluated by the faculty-member-in-charge to ensure accuracy and relevancy. After this evaluation the “team” makes a presentation to the P.I., the faculty- member-in-charge and other interested faculty members and parties from the School. Further input is provided by the faculty members in attendance to the “team” to finalize their report.

Upon completion of the final report, which is evaluated by the faculty-member-in-charge once more, student “team” makes the final formal presentation to the DPW employees and submits the final report to the DPW. The final decision for approval or rejection of the “product” resides with the DPW. Even though a product may get a favorable review as a result of the NPR process, the city may still choose not to allow the product be approved for use for other reasons. Some products may need to go through more testing or field applications prior to approval or the “team” may be asked to further research certain aspects and issues in more detail.

The recording of the presentations, scheduling of presentation of the vendor, and later the presentation of the student team to the faculty members and to the City and all other ancillary activities are coordinated by a graduate research associate. This person is also charged with ensuring of depositing and distribution of all funds as needed, as well as, keeping a digital safe of all submissions by the vendor, electronic or otherwise, and digitizing all submissions as needed.

The P.I, the faculty member in charge, the research associate, and the students in the “team” all get paid on a lump-sum or hourly basis according to a pre-established schedule and rates. The objective has been to totally complete a review process for a new “product” in about three months, not including the time the DPW takes to make the final decision.

IMPLEMENTATIONS

Since signing of the contract with the City on July1, 2009, the number of “product” reviews that have been completed is 17. The following should provide an idea as to what has been reviewed:

- Storm Water Quality Units to capture the "first flush" during a rain shower
- Spiral Welded Steel Pipe
- Fiberglass reinforced polymer mortar pipe for water and wastewater pipeline applications.
- Two part plural component spray applied polyurethane corrosion
- Water chamber
- Elastomeric Polyurethane Lining System
- CIPP liner. Spiral Wound Composite of Fiberglass and resin cured with Ultra Violet light.
- Plastic Pipe
- Concrete additive for corrosion prevention
- Hydrodynamic Separator

- Rubber manhole frame
- Manhole odor remover
- Fusible PVC pipe
- Composite manhole covers
- Ultra Violet Cured fiberglass pipe
- Modular storage medium for underground detention/infiltration
- Storm water quality separator
- Manhole unit

INCORPORATION INTO THE CURRICULUM

There is no question that as a result of each new “product” review, there is a lot of learning that takes place on the part of the undergraduate and graduate students that are involved for the review of that “product.” However, since the “products” are often very new and represent the latest in the construction industry applications, it would be a loss not to have the acquired expertise and know-how find its way into the classroom also. Fortunately this has been possible in view of some senior level classes including but not limited to the Hydraulics and Drainage class. Since, as elaborated above, most of the new “products” reviewed relate to wastewater and sewer systems, which are inherently a topic for the Hydraulics course, the transfer has been easily and readily facilitated. For other products, since each new “product” review is headed by a faculty member whose area has a real connection to what is being reviewed, ensuring the classroom connection has been inherently built into the undertaking.

EXPANDING “NPR” TO THE NATIONAL/INTERNATIONAL SCALE

Looking at the concept of NPR from a national point of view will open an innovative way of new product/service utilization in the underground infrastructure market. A major component of meeting the challenges facing our infrastructure will be embracing the most effective technical solutions. Many of these technologies are very to utilities, and with that, there is the fear of failure for these new, untried and untested “products” which becomes a major obstacle. Historical evidence and experience shows that many excellent technical solutions have never become sustainable due to the time and cost associated with overcoming the barriers of market entry. The most effective way to minimize product failure is to accurately validate the application claim.

The concept of nationalization and internationalization of the NPR program is intended to be an enhancement to and not a replacement of the Product Review Committee (PRC) work within a utility, such as the DPW of Indianapolis, complimenting the PRC work to enable an unbiased review of each new product. The goal is to help and improve the process of new product review and acceptance and/or rejection without undue influence from any party that may have a self-serving interest.

A non-profit organization will be established to be the core institution of this collaboration between academic entities, municipalities, manufacturers, and service provider companies. Municipalities and consultants will become members of this organization which will allow them to access resources that

encompass the universities, previously reviewed and validated technologies database, and conferences and publications related to the underground infrastructure and trenchless technology.

ASSESSMENT

No assessment of this undertaking has been carried out so far. The plan is to survey graduate and undergraduate students who have participated in the undertaking to determine if the educational objectives inherent in the undertaking have been attained, to what degree, and what skills exactly have been gained. It is hoped that this summative evaluation will provide valuable input for areas that need improvement.

CONCLUSIONS

Being a part of the new product review process has benefited IUPUI/CEMT and its students in many ways. Through this highly appreciated service-learning undertaking it is perceived that students gain professional experience, even though a formal assessment has not been carried out yet, while being financially compensated for their time. This process seems to have proved to greatly enhance their experiential learning. They seem to have developed skills related to research, technical writing, technical presentations and team work, as much as it could be concluded from their reports and presentations. They also have had the opportunity to become more familiar with the DPW, various industries, and public entities.

The NPR process has provided opportunities for students to strengthen skills in conducting technical research and reviews and reporting on an array of new products and technologies which are often very new and pioneering introductions of new materials, processes, and technology to the construction industry. In addition, it has promoted communication and professionalism among students and professors and also with individuals outside the university. The opportunities for networking with leaders from a variety of organizations and industries, public employees of the City, and community leaders has provided for rich learning and networking experiences. Students themselves have shown great enthusiasm for the process and have expressed overall satisfaction as to how it enhances their development.

The above described process not only benefits students but also helps the city of Indianapolis and the DPW. As a university, IUPUI is able to reduce the cost of new product and service reviews while providing more information and input required for reliable decision-making in a reasonable amount of time to the City of Indianapolis. In addition, the NPR process is a convenience for representatives and manufacturers (i.e. the Vendor) presenting their product or services as it enables them to obtain a fair and thorough evaluation in a shorter period of time when compared to the status quo.

This collaborative process brings many advantages to the City including a working relationship with the University that provides for the streamlining of new product investigations and the utilization of the vast research capabilities that the University inherently brings to the table. The City/DPW management is convinced that working with IUPUI will increase their technical knowledge base and help them to understand how some new products have successfully been used in other locations throughout the United States and the world.

Recently, there has been interest expressed by other cities in Indiana, as well as, cities from other states in the U.S.A to adopt the NPR process or develop similar collaborations.

In view of work that has been undertaken within the context of the NPR process so far, it has been observed that the NPR process raises the “service learning” concept to a whole new level. “Service Learning” has been one of the primary objectives of IUPUI as an institution of higher learning for some time now and it has been implemented in various ways in diverse contexts. This undertaking has already started providing our students with the opportunity to develop a wide range of skills through professional experience and experiential learning that will benefit them in the future in their respective careers. Overall, this unique service learning implementation is transforming the University from being just an urban amenity to a real urban asset, the basic tenet of service learning.

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