Developing an Introductory Green Building Workshop for and with Construction Management Students

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Integrating sustainability in construction management (CM) higher education programs has presented curricular challenges in the recent years. This deficit has been causing a lack of knowledge about green building research and practice among the graduates of CM and similar disciplines. This paper presents the process of developing a green building interdisciplinary workshop series as an extracurricular activity at Roger Williams University (RWU). The workshops were organized by the United States Green Building Council (USGBC) Student Group, and covered materials in parallel with the requirements of the Leadership in Energy and Environmental Design Green Associate exam. These efforts were funded by an internal university grant during Fall 2010 and Spring 2011 semesters. Attendees were given surveys to complete at the end of the workshop series. The majority found the workshops to be "helpful" and "extremely helpful." This paper describes the recommendations provided by the attendees, which are currently being applied to the future offerings of the workshops. Authors suggest increasing efforts toward recruiting students, faculty, and professionals from architecture, engineering, natural sciences, and business disciplines to participate in the workshops. Similar efforts are expected to help achieve the desired benefit of educating students to implement sustainable practices in their careers.

Key Words: Green building workshops, LEED Green Associate, Sustainability Education

Introduction

As technology progresses, the construction management (CM) curriculum has become inundated with new material in an attempt to stay current with the industry outside the classroom. Due to the essential fundamentals taught in higher education, there is little room to introduce this recent material into the mandatory class requirements. Employers seek graduating students to be ahead of the curve and provide skills that will contribute to the success of their company. As it stands now, there is minimum room to properly teach many of these up-and-coming topics in an undergraduate program. A pertinent example of this is green building--a part of the construction industry that is expanding rapidly, yet is hard to merely touch upon in the classroom. The problem then becomes how to present this additional information to undergraduate CM students without removing material from their current curriculum.

The Roger Williams University (RWU) United States Green Building Council (USGBC) Student Group created a Leadership in Energy and Environmental Design (LEED) Green Associate (GA) workshop series to introduce students to the principles of green building. This workshop provides students of various disciplines the opportunity to advance their knowledge of sustainability and assist in preparing them for the LEED GA exam. Although there are several green building assessment systems available, LEED GA was chosen due to its introductory approach to green building issues in lieu of exams focusing on the rating systems themselves. Through a three-week process students are exposed to the topics covered in the six categories defined by the LEED Rating System as follows:

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation in Design

The course also contains prevalent case studies to further illustrate the implications of sustainability when applied to industry projects. For upcoming semesters of the workshop, there are plans to have speakers from the construction industry attend to impart gained knowledge, and provide real world experiences of incorporating sustainability into the workplace.

Recognizing Demands of the Greening Job Market

As described by the United Nations Environmental Programme's (UNEP) Green Jobs report (2008), green jobs support solutions to help protect human population from drastic and harmful climate change and protect the environment that sustains life on earth. The deteriorated quality of the environment caused by pollution, decreased biodiversity, and depletion of natural resources is one of the most serious threats facing economic and broader sustainable development (UNEP, 2008). The UNEP (2008) study described six main sectors of the economy that are significant within the realm of green products and services: energy supply, building and construction, transportation, basic industry, agriculture, and forestry. Green products and services are defined as those that contribute to environmental conservation through pollution control, resource conservation, energy conservation, the production of renewable/alternative energy, and environmental assessment (ESA, 2010). The 2.4 million green jobs already in existence are equivalent to fifteen months of the average job growth in the five years preceding the economic recession of the late 2000s. Of the major industries related to green jobs, the building and construction industry holds the highest share of purchases and employment (ESA, 2010). USGBC predicts that as the demand for sustainable construction and development continues to increase, the green building industry would support more than 7.9 million jobs from 2009 to 2013. Of the nearly 8 million jobs, 230,000 of them are expected to be supported directly by LEED-related spending within the industry, predicting an exponential future growth in the demand for professionals knowledgeable of green building principles and practices, especially those specific to LEED (BAH, 2009). UNEP's report (2008) describes a shortage of necessary skills among architects and engineers, which hold back some advancement in the movements within green industries. UNEP (2008) states that due to a lack of knowledge in green materials, designs and methods of construction among the building industry, application of these strategies in current building projects are still rare. Efforts to educate the building industry professionals could have extensive and positive implications on the sustainability movement (UNEP, 2008).

Working to Stay Current

Currently the CM curriculum teaches the fundamentals of the industry to young, aspiring undergraduate students. The thirst for current knowledge of such a continuously evolving industry, however, has left students dry. This issue of lack of knowledge in the sector of sustainability must be addressed while students are still in the undergraduate phase of their education. In his article titled, "Sustainability Curriculum in Higher Education: A Call to Action," David Orr states, "The real challenge we face in embracing a more sustainable future rests with our ability to educate the students differently (AASHE, 2010)." Recognizing this void of information in a curriculum is the first step. The next step, which is where most good ideas perish, is filling that void, and providing courses to educate students on sustainability. Roger Williams University took the first step two years ago when they instated a Sustainability Studies Minor. The mission for the minor reads, "… facilitate deeper student exploration of complex

interrelationships among contemporary environmental, social and economic problems and their possible solutions (RWU, n.d.)." Contemporary environmental, social and economic problems are the genre of problems that construction managers face every day once they join the work force. Unfortunately, the current curricular requirements, such as a mandatory Business minor from a CM undergraduate student, do not allow much room for a minor in Sustainability Studies. Based on the status of the current CM curriculum, it is evident that the best way to educate undergraduate students in the field of sustainability is to offer a workshop outside of the required classes.

LEED the Way

The major premise of the RWU USGBC Student Group workshop is based on preparing for the LEED GA exam. This exam is intended for professionals who want to demonstrate green building expertise in non-technical fields of practice (USGBC, n.d.) In order to obtain this credential, one must know the basic knowledge of green design, construction and operations. LEED provides building owners and operators with a framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions (USGBC, n.d.). One of the many facets LEED offers is for people to obtain the LEED GA credential before pursuing their LEED AP certification. The LEED GA exam is comprised of questions developed and validated by global work groups of subject matter experts. This exam references current standards and resources and is designed to satisfy the test development specifications of a job analysis. The purpose of the exam is to test the applicants' knowledge of procedures and performance, and lastly, analysis questions, which test reasoning and problem solving abilities.

Participant Survey Results

Students at RWU in leadership of Sigma Lambda Chi Chapter Phi III, decided to create the RWU USGBC Student Group in the Fall of 2009. This organization officially started its activities in the Spring of 2010. The intention of the student group is to encourage students to spend time on sustainability outside the classroom. Forty-three students and two industry professionals attended the RWU LEED GA Workshops. There were a total of six workshops, each surrounding a different credit category of the LEED rating system. The workshops were held twice a week (Monday and Wednesday evenings) over a period of three weeks. They were held in a lecture hall within the School of Engineering at RWU. Workshop presenters were students who had previously earned their LEED Green Associate credentials. Under the guidance of a CM faculty member, students created the curriculum and materials with the support of an internal grant from the Foundation to Promote Scholarship and Teaching at RWU. Supplemental materials were hosted and managed on a centralized website, which students had access to throughout and after the workshops. Individuals who attended all the sessions and took a final exam were presented a certificate of completion, which could be used to satisfy eligibility requirements for taking the LEED GA exam. The purpose of the exam was to expose participants to exam conditions and attendees received specific feedback that their results did not impact their eligibility of a completion certificate.

Industry professionals from a wide range of building related fields were sent invitations through the CM advisory board, to attend the workshops. Industry professionals were also invited through the School of Architecture administration. In addition, the workshops were advertised campus-wide with an emphasis on the schools of engineering and architecture. At the end of the workshops, participants were asked to complete a survey, which asked for their feedback on the workshops. The results presented in this paper are based on the responses received from thirty of the forty-five attendees who have completed the evaluation survey.

Participant Demographics

The LEED GA workshops were predominately attended by males, which made up 74 percent of attendees. The participants were also largely made up of students, especially undergraduate freshmen and seniors. This is most likely due to the motivation that comes along with being a freshman and the eagerness for seniors to build their resumes prior to their job search. The group also consisted of an even number of college sophomores and juniors, a

few graduate students and industry professionals (Fig. 1). The positions of the industry professionals varied and were from industries ranging from waste management to construction management.

Participant Feedback

Workshop participants generally thought that the workshops were very helpful (Fig. 2). When asked which portions of the lecture should be altered one participant responded "None really, program was really good." There were several minor suggestions as well such as "I think you should include more quizzes. There was a lot of material presented in a short period of time, and it was hard to gather it all in." Apart from administrative details, the participants seemed to appreciate the opportunity, and on more than one occasion requested that the workshops continue in the future.



Figure 1: Education Level of Participants



LEED Green Associate Exam

Although the workshops were designed to give participants a general overview of the green building industry, the main focus was to prepare students to continue their studies in preparation for the LEED GA exam. The majority of

participants indicated that they were interested in taking the exam, and approximately a third of those indicated they were planning to take it more than four months after the conclusion of the course (Fig. 3).

Authors are planning to conduct a follow-up study in the upcoming semesters to investigate if there are any correlations between when students take the exam and their success rate. A hypothesis may be that the later they take it, lower the accreditation rate will be. This may not be due to failing the exam but potentially due to not taking the exam at all, in contrary to their original intentions. Authors are considering a wider research study to identify any other factors that may impact students' success rates in the LEED GA exam, by the end of the workshops described in this paper.



Figure 3: Responses to "When are you planning on taking the LEED GA exam?"

Challenges & Future Recommendations

Recruiting Students from All Disciplines

One of the biggest challenges of the overall workshop activity was eliminating the perception that the principles of green building only relate to certain academic disciplines. It was thus a challenge to instill the idea that the principles are actually interdisciplinary. The easiest connection to make with sustainability is to the fields that are directly associated with the building industry such as architecture, engineering, and construction management. However, students in the environmental sciences may also benefit from this extracurricular educational activity as buildings make up increasingly more of the physical environment, and have increasing interference with the natural environment. It is, however, more difficult to extract interest from students in those fields such as business administration, various social sciences, and education, despite the fact that green building can play an important role in the practice of these disciplines. Green building industry is growing rapidly, and this is creating a significant opportunity for students studying in the school of business. There is plenty of room for further education in green investments, sustainable project management, life cycle cost and analysis, etc. The fundamental principles underlying the green building movement also have clear correlations with issues discussed in the social sciences and education as environmental ethics and various human perspectives are ever growing topics of thought. The questions have arisen during the workshops regarding why humans have taken full ownership of the planet, and that other species and underrepresented groups are expected to deal with the consequences of this ownership. These are questions that are becoming more pertinent in our culture and are greatly associated with green building.

Participants in attendance at the GA workshops came from a variety of backgrounds, however they mostly pertained to the building industry. It turned out to be difficult to recruit engineering students to participate in the workshops. Representing other fields was one student who was studying accounting, and three students studying environmental

science. Future workshops will be more heavily advertised to students outside architecture, and construction management fields toward creating more diversity within the audience of the workshops.

Exam Costs

The certification exams associated with green building are expensive specifically for college students. While there maybe other contributing factors, exam cost has become a deterrent for students who are interested in continuing their green building education and accreditation. The cost to take the LEED Green Associate exam is currently \$250, which includes a \$50 registration fee and a \$200 exam fee. There is a \$50 discount available for students with documentation of enrollment, but the total still comes in at a relatively high \$200. Given a student generally has a limited income and relatively high expenses, the cost of this exam is most likely perceived to be high for its immediate benefits. This has caused many students to postpone taking the exam that unfortunately leads to losing much of the information they were given during the workshops. Without an effective way to mitigate the costs of the exam, the information retention and quest for new information will most likely dissipate. USGBC student group is currently in the process of and have been partially successful locating funds to support exam costs for its members in the upcoming semesters. As participation and popularity of the workshops are increasing, it will be easier for the group to solicit funds from internal and external sources.

Conclusion

Green building and sustainability education is becoming an important aspect of education in many disciplines. It is important for higher education institutions to take on these newer topics and integrate them into their traditional curricula. However, professional schools specifically have a big challenge of this incorporation due to tight course schedules. A potential solution to the lack of sustainable education is to develop workshops that take place outside of the class. Although not representative of sustainability in general, LEED GA exam workshops include basic and introductory green building and sustainability concepts. Thus these workshops are at an appropriate level to be administered to undergraduate students. As the industry demands employees with better training in general sustainability issues, it is not difficult for these workshops to find support and interest. Allowing student groups, such as the USGBC Student Group to work with the assistance of faculty members in creating a workshop series, provides a platform to incorporate social student activities into academic learning objectives.

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