

Incorporating the Certified Green Professional (CGP) Designation into a University Residential Construction Management Specialization

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This paper presents the incorporation of the Certified Green Professional (CGP) designation from the National Association of Home Builders (NAHB) into the Residential Construction Management Specialization program at a major university. Incorporating the CGP curriculum and professional designation, not previously provided at the university level, has many challenges, not the least of which are anticipation of the career aspirations of the students enrolled and the expected educational outcomes by the industry. The addition of the CGP course and professional designation into construction technology education, the contractual relationship between the university and NAHB, the requirements of the educators delivering the courses, and the integration and administration of NAHB industry curriculum into an undergraduate residential construction management specialization program are discussed. The CGP Designation from the NAHB has been recognized nationally in the residential construction industry for leading the way in green building and enhancing the professionalism of the residential construction industry. This paper answers the question: Can the NAHB CGP designation offering be successfully incorporated into an undergraduate residential construction management specialization course? A course evaluation survey was conducted at the end of each semester to obtain the students' perspectives about the course. The results of the student surveys are presented and discussed. The authors discuss the challenges, lessons learned, and future course planning.

Key Words: Green Building, NAHB, Undergraduate Education, Designation

Introduction

The residential construction industry has gone through a period of transformation. Economic conditions and a growing interest in sustainability are changing the way home building is performed. This change has to do with areas that are required to effectively manage residential projects such as business plans, marketing plans, sales plans, and subcontractor agreements. With the collapse of the housing market, the job market for homebuilding industry professionals has also followed suit. As a result, the job market for construction management (CM) graduates seeking jobs in residential construction has been competitive. Obtaining professional designations is one extracurricular activity that may "exhibit a strong, positive association with recruiters' employability ratings" (Cole, et al, 2007, p. 323).

In today's tight job market, a professional designation may not only help set a college graduate apart from their peers, but it may also keep their education current. "Trends in the construction industry are constantly shaping and changing what construction management programs are teaching" (Brown, 2009, p.110) It was the goal of Purdue University's Department of Building Construction Management (BCM), through collaboration with the NAHB University of Housing, to incorporate the NAHB professional designation into the BCM program. "Providing students with professional development opportunities is an important addition to an undergraduate education" (Brown, 2009, p.113).

There has been a push by many universities to incorporate green building into their curriculum (Tinker & Burt, 2004). While there are multiple green certification programs available for the residential market, the top two recognized programs are the United States Green Building Council (USGBC) with their Leadership in Energy and Environmental Design (LEED) for Homes, and the National Association of Home Builders (NAHB) National Green Building Program. Both programs offer 3rd party green certification of homes. The NAHB National Green Building Program is based on the American National Standards Institute (ANSI) ICC 700-2008 National Green Building Standard (NGBS) for residential green building certification and offers the added benefits of a Certified Green Professional Designation (NAHB, 2009) for industry professionals.

A graduate of the program will have the opportunity to obtain three professional designations; Residential Construction Superintendent (RCS), Certified Aging in Place Specialist (CAPS), and Certified Green Professional (CGP). The focus of this paper is on the incorporation of the CGP certification process into the Purdue University BCM program and their Residential Construction Management (RSCM) area of concentration.

The Certified Green Professional (CGP) designation is part of the NAHB Professional Designation and Green Building Program. This designation was originally designed to give building professionals continuing education and credibility in green building. Homebuilders with the CGP designation have the potential to become more successful at green building because they have learned to identify and adapt to the social, economic, political, environmental, and technological issues affecting green building and their businesses.

Course Concept

The RSCM area of concentration is one of six offered by the Purdue University BCM program. These concentrations prepare students for employment in a focused area of construction management. Each concentration has two to four area specific courses and the students must take 6 to 12 semester hours specific to the area of concentration to earn the specialization designation on their transcript. It is the goal of the RSCM concentration to provide advanced education to students pursuing a career in the homebuilding industry, through a combination of residential coursework and qualified work experience. The coursework includes the areas of land development, design, planning, estimating, scheduling, residential construction methods, marketing, cost analysis, and customer service.

The most current RSCM program update is an attempt to educate students about green building and to better prepare CM graduates for the competitive job market. Industry-university collaboration has been recognized as a value added component of construction management education (Kudav, Cala, Davis, & Patel, 2004; Tener, 1996). The faculty believed that an industry-university partnership with the NAHB would greatly enhance the RSCM course offerings. A long-term working relationship has been maintained with NAHB through their Student Chapter and its involvement with the annual NAHB Student Competitions. The advancement goal of this partnership was to facilitate faculty and student professional development as well as to incorporate a nationally recognized industry professional designation program into the RSCM area of concentration. It was also the goal of this BCM / NAHB collaboration to become a model for university residential construction education programs. This program could be replicated at peer institutions, therefore increasing the impact and the number of students and industry practitioners with NAHB professional designations.

Research Questions

Can the NAHB CGP designation offering be successfully incorporated into an undergraduate residential construction management specialization course?

CGP Designation Requirements

The CGP designation requires completion of two NAHB courses; the two day (16 hours) “Green Building for Building Professionals” and the one day (eight hours) “Business Management for Building Professionals”. These courses are normally taught through a local Home Builders Association (HBA). The Business Management course is a requirement for other designations as well. Once a student has taken Business Management, it can be applied to the other designations. For each course, NAHB provides an instructor manual, PowerPoint slides, a student guide, a skills check exam, a Scranton answer sheet, as well as course and instructor evaluation forms.

Contractual Relationship

A license agreement was established for use of NAHB copyright materials and was required before the CGP curriculum could be taught in the university classroom. This was the first license agreement ever granted to a university. The agreement lists details for payment of NAHB fees, instructor requirements, and use of the NAHB curriculum.

There is an annual site License Fee of \$300. The RSCM instructor follows the same procedure to order the instructional material from NAHB as an industry professional would follow. There is a \$90 per student course material fee for both the Green Building and Business Management courses, along with a \$145 graduation fee for the CGP designation. The RSCM students pay \$180 for the course fees and view it as part of their normal book cost. They receive a certificate of course completion from NAHB. It is up to the students to pay the \$145 NAHB Graduations Fees to fully complete their CGP certification.

Requirements of the Educators

Two faculty members completed the NAHB CGP instructor approval process. To become an instructor for any of the NAHB professional designations, the faculty has to have industry experience related to the designation. They must take the designation courses in the original industry format that they were offered, pass the skills check, and earn the designation. They also must take the NAHB “Train the Trainer” Course. They then submit their instructor application for review by the NAHB instructor review committee. The committee review takes three to six weeks and the committee reserved the right to withhold instructor approval.

Integration of NAHB Industry Curriculum into Residential CM Program

Residential Construction: Green Building is a three credit, two-hour lecture, two-hour lab, 16-week course. This course provides approximately 60 contact hours with the students. It was stipulated in the license agreement that the 24 hours of content required for the CGP designation be taught using the NAHB curriculum as provided to the university. The balance of the 36 contact hours was open to explore and expand upon green building topics by the instructor.

The NAHB CGP Designation course objectives were incorporated into the overall course objective list for Residential Construction: Green Building as follows.

At the completion of the course, the students will be able to:

- Explain the goals of the National Association of Home Builders, the National Green Building Program, the Green Building Guidelines, and identify the individual components of the program.
- Explain the basic building science principles behind the growth of the green building movement.
- Explain considerations for locating and designing green development sites.

- Describe the strategies for effective moisture control and durability for each component of the building envelope.
- Describe various resource-efficient materials used to achieve comfortable, safe, and sustainable buildings.
- Describe green building energy efficiency requirements and the strategies for meeting, exceeding and verifying them.
- Describe indoor and outdoor water conservation practices.
- Identify methods for achieving indoor air quality.
- Describe important considerations for approaching green building objectives in a remodeling project.
- Explain a homeowner's and builder's role in effective operation and maintenance of a green home.
- Identify successful business management, marketing, and sales strategies to sell green.
- Discuss common business challenges for residential construction as well as practical tips and tools to overcome them.
- Apply the key measures of business performance to a residential construction business.
- Complete an audit of a residential construction project, using the NAHB Verifiers Guide and Checklist.

The final project for the most recent offerings of the course was to score house plans for the local Habitat for Humanity (HFH) chapter. The local chapter already had their homes Energy Star certified and was interested in having them Green Certified. The students were broken into small groups and given one of the "typical" plans that the local chapter builders. They were required to score the homes using both the Green Building Guidelines and the National Green Building Standards online scoring tool. They were also required to provide a scoring report, a written report documenting the areas that HFH needed to add to their construction process to meet the Bronze and Silver Level, and a group presentation for the class and HFH.

Success in the student's achievement of the objectives was assessed by utilizing the Green Building and Business Management section review questions as assigned homework, individual student research combined with class presentations, a group Green Building Scoring Tool certification project, and two multiple choice exams provided by NAHB. Successful completion of the course, submission of a graduation application, signed Code of Ethics, and two years industry experience are requirements of CGP graduation. The NAHB accepts a completed BCM degree in lieu of the two year industry experience requirement.

The course content for the Residential Construction: Green Building, as offered in the fall semester of 2009 and spring semester of 2010, is outlined in Appendix A, Table 1. Courses that are offered as part of areas of concentration are typically classified as technical electives within the overall curriculum. The only prerequisite for students wishing to take the Residential Construction: Green Building course is the requirement that they join the NAHB Student Chapter. The registered students tended to be predominantly juniors and seniors in both semesters. The introductory nature of the material allowed the sophomores taking the course to participate fully. Residential Construction: Green Building was offered again in the fall semester of 2010 with an enrollment of 24.

Survey Results

The authors used a survey instrument that was provided by the NAHB to answer the research question. The survey was also utilized to obtain feedback from the students in order to ensure the delivery system was effective and to improve areas that may not be effective. This NAHB uses the survey for similar purposes. The students were asked

to check any of the items that applied on question one. Items two through ten were answered by the students on a Likert scale of 5 to 1 with 5 being strongly agree to 1 being strongly disagree. The students completed the survey questions in Table 2.

The class size was 19 students in Fall 2009, 14 students in Spring 2010, 18 students in Fall 2010, and 11 Students in fall 2011. All 62 students answered the survey. The survey was anonymous. The results are posted below.

NAHB Participant Feedback Questions							
1. What were your objectives for attending this course (check all that apply?)							
Earn Designation-73% (45 of 62)							
Professional Growth-45% (28 of 62)							
Networking Opportunity-11% (7 of 62)							
Interested in Topic – 40% (25 of 62)							
	Frequency					Mean	Mode
	5	4	3	2	1		
2. I will be able to apply what I learn to my job.	45	14	3	0	0	4.68	5
3. The audio-visual aids helped me follow along and learn the information.	32	22	7	1	0	4.37	5
4. The course increased my knowledge of the subject.	49	12	0	1	0	4.76	5
5. The examples and activities helped me understand the information.	36	22	4	0	0	4.52	5
6. I could follow along with the instructor(s) in the student guide.	46	16	0	0	0	4.74	5
7. I was encouraged to ask questions and participate throughout class.	47	12	3	0	0	4.71	5
8. The course prepared me for the test.	47	15	0	0	0	4.76	5
9. I would recommend this course to others.	48	12	1	1	0	4.73	5
10. Overall, the course met my expectations.	47	13	1	1	0	4.71	5

Discussion of Survey Results: Student Evaluations

Seventy-three percent of the students responded that they wanted to earn the NAHB Professional Designation as a reason for attending the course. Forty-five percent attended for Personal Growth. Only 11% were interested in taking the course as a networking opportunity. The authors' feel the networking opportunities part of the question is focused more toward industry groups than students.

Students responded that the course prepared them for the test (question #8, high mean of 4.76), and that they felt that the course increased their knowledge of the subject (question #4, high mean of 4.76).

There were some who felt the audio-visual aids could be improved to help them follow along and learn the information (Question #3, low mean of 4.37). The Green Building course PowerPoint presentations were designed in 2006. The slides discuss topics in green building that are still relevant to today, but with excessive bulleted lists and verbiage. Others struggled with some of the activities and examples in the curriculum (Question #5, the second lowest mean of 4.52). The original audience for this curriculum was intended for industry professionals with field experience, something that many of the students have yet to gain.

Challenges and Lessons Learned

The original format design of the CGP curriculum was a three-day course. The PowerPoint presentations, questions, and activities were paced for the three-day format. One of the challenges for the instructor was to re-pace the course over a 16-week period. During the day-long format, the time was more flexible to allow for good discussion and closure before moving on. On frequent occasions, good discussion or a section was cut short by the end of class. This required the instructor to reconnect the line of thinking during the next class period.

The green scoring tool final project of the HFH house reinforces the lectures and discussions from earlier in the semester. A larger impact is made on the students when they score each chapter as it's being discussed during the semester, instead of waiting until the end as a final project. It allows them to ask questions about a particular topic in the scoring tool and go more in depth into each chapter. Waiting until the end of the semester makes it just a final project the students work through with the attitude of "Just get it done!"

The Green Building PowerPoint's with the bulleted list and verbiage makes it difficult for the instructors to present a dynamic presentation. There are many more visual and web media resources on the topic of green building available today and university students seem to respond better to multiple media teaching tools. To incorporate this updated material, the instructors have added secondary presentation material alongside the NAHB Curriculum. Students were encouraged to use up-to-date resources for their research topics and presentations. The group activities were also designed for industry professional with field experience. A majority of the students did not have the field experience to understand or relate to some of the group discussion activities.

The importance of energy auditing equipment is discussed throughout many sections of the green building course. Because of the importance of these tests and the third party verification for a Green Home certification, it would be a beneficial teaching experience to actually see these tests performed. During the fall 2009 semester, the BCM department did not own the required testing equipment, so a field trip to a home being tested was planned. Unfortunately, the verifier did not show up at the jobsite during the class period as they were scheduled, so the students were unable to observe the test.

Future Course Planning

With the continuing growth of Green Building resources, there is a great opportunity to supplement and expand the green building course in conjunction with the NAHB Curriculum. Some of the course considerations are the integration of the Building America and Builders Challenge program through the NAHB Research Center's partnership with the U.S. Department of Energy. The Research Center is currently developing a green building educational curriculum tool kit for two and four year universities with residential construction management programs. The authors have been participating in the development of this resource.

Due to the low score on question 5, energy auditing equipment was purchased by the department. A faculty member is currently exploring ways to better incorporate this equipment into the course to provide students with better examples and activities. Current ideas of examples and activities are:

- A blower door envelope air leakage test
- A duct leakage test
- An infrared thermal scan

- Air testing to assure safe levels of carbon monoxide

Conclusion

The NAHB CGP designation offering can be successfully incorporated into an undergraduate residential construction management specialization course. Seventy-three percent of the students taking the course did so for the NAHB CGP designation. The students realize the value of the Certified Green Professional training and professional designation. In the tight job market, they added designation sets them apart from their peers. They are better prepared to work in the residential industry and have a better understanding of what it takes to build green certified homes. Also, 97% of the student said they would recommend this course to their peers. The administration of the University program interprets this as a success. This course is a core part of the residential specialization and will be offered every fall semester going forward.

Much additional work is required to continue development of undergraduate education in principles of residential green construction. Continued input from the students is needed to continue to enhance the incorporation of the Certified Green Professional (CGP) designation from the National Association of Home Builders (NAHB) into the curriculum. Additional surveys may be performed in order to analyze the results of future improvement to the course. A potential area of further research would be a follow up study with another University that has incorporated the NAHB CGP designation in their curriculum.

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Appendix A

Table 1

Residential Construction Course Outline

Wk #	Major Topic	Instructional Activities	Subject Matter Covered
1	NAHB & the National Green Building Program	Lecture & discussion	Course Overview NAHB Green Building Program
2	Green Building & Energy Programs	Lecture & discussion Student research/pres.	Energy Star Homes & HERS Rating LEED for Homes
3	NAHB Verifier	Guest Speaker	NAHB Verify Process HERS Rating
4	NAHB Green Building for Building Professionals	Lecture & discussion Student research/presentation	Green Building Into Building Science Principles
5	NAHB Green Building for Building Professionals	Lecture & discussion Student research/presentation	Site Development Building Envelope
6	NAHB Green Building for Building Professionals	Lecture & discussion Student research/presentation	Resource Efficiency Energy Efficiency
7	NAHB Green Building for Building Professionals	Lecture & discussion Student research/presentation	Water Efficiency Indoor Air Quality
8	NAHB Green Building for Building Professionals	Lecture & discussion Student research/presentation	Remodeling Considerations Effective Operation
9	NAHB Green Building for Building Professionals	Lecture & discussion Student research/presentation	Homeowner training Marketing & Selling Green NAHB Green Building Exam
10-11	NAHB Green Scoring Tool	Lecture & discussion Group Scoring Project	Scoring Tool Training Blower Door & Duct Blast Test
12	NAHB Business Management for Building Professional	Lecture & discussion	Business Basics Planning: The Map Purpose: Creating the Itinerary
13	NAHB Business Management for Building Professional	Lecture & discussion	People: Who to Chose Performance: Are We There Yet? Progress Monitoring & Evaluation NAHB Business Management Exam
14	Group Project Progress	Report & Discussion	Green Guidelines & Standard
15	Group Project Presentation	Report & formal presentation	Green Home Certification
16	Course Review & Wrap-up	Lecture & discussion	CGP Requirements /Course Evaluation