AC 2011-372: ESTABLISHING GREEN BUILDING INSITUTE IN A SCHOOL OF ENGINEERING

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Establishing Green Building Institute in a School of Engineering Technology

Introduction

Farmingdale State College, New York (FSC), in partnership with Eastern Suffolk Board Of Cooperative Education Service (BOCES) and Long Island Works Coalition (LI Works), plan to advance environmental responsibility and sustainability on Long Island by establishing a Green Building Institute (GBI). The primary function of the GBI at FSC is to assist educators to create and implement new curricula and learning experiences designed to educate and produce a workforce that will be available for employment in green industries, construction trades, and related enterprises[1]. The educators who will collaborate in this project are university faculty from FSC, Educational Opportunity Center instructors, adult and secondary technical instructors from ESB, and High School instructors through LI Works Green Career Academies. As a public college of applied science and technology founded in 1912, FSC enrolls 6,800 undergraduate students in Schools of Engineering Technology, Health Sciences, Arts and Sciences, and Business. FSC boasts faculty expertise and other resources that will be dedicated to leading the GBI. FSC also hosts the Long Island Educational Opportunity Center that offers free GED and vocational training for educationally and economically underserved adult learners. Eastern Suffolk BOCES is an educational cooperative of 51 Long Island school districts that provides career and technical education for secondary students and adults. The curriculum prepares students for entry-level employment or for higher education in vocational fields. The Long Island Works Coalition is a not-for-profit corporation founded in 1999 for the purpose of establishing partnerships between employers and the educational community so as to prepare students for the 21st century workforce needed on Long Island. Currently, LI Works partners with three high schools that feature small learning communities or "Career Academies" that have an environmental focus: Bridgehampton High School's Green Career Academy, 2 Central Islip High School's Green Technology Academy, and East Islip High School's Environmental Green Academy. The college, high school, GED, and vocational faculty involved in this project will partner with, and serve, stakeholders on Long Island that play vital roles in the creation of green jobs and industries. Such stakeholders include representatives from the following sectors: industry, architects, builders, utility companies, landscape architects, trade unions, municipalities, urban planners, research labs, as well as other universities and non government organization's including the U.S. Green Building Council Long Island Chapter.

Goals and Measurable Objectives

The primary goal of this project is to create and implement new curricula and learning experiences that will educate a green workforce to meet the growing demand for employees in the green industries, construction trades, and related enterprises on Long Island. The immediate measureable objective is to see forty educators drawn from FSC,

EOC, BOCES, and LI Works Career Academies engaged in assorted curriculum development activities sponsored by the Green Building Institute.

Anticipated Outcomes

The major anticipated outcome is that at least five new curricular components will be created by the end of Year 1. In accord with the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program for rating buildings, the educators involved in this project will design curricula in the areas of engineering, energy, architecture, horticulture, landscape architecture, and the natural and health sciences, with a specific focus on the six "checklist" areas used to plan LEED buildings: sustainable site, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation and design. The goal is to infuse sustainability into construction education and career development. For example, in designing new curricula, faculty will focus on areas such as: Alternative energy – solar, wind, geothermal, hydrogen fuel cell, bio-diesel; Alternative construction and insulation materials; Architectural design for energy efficiency, including use of indigenous solutions; Storm water management, water harvesting, and water efficient landscaping; Green roofs and green walls; Ecosystems and site design, sustainable gardens, and optimization of landscaping strategies for Brownfield restoration; HVAC/energy management; Electrical engineering for temperature control, lighting; and Testing newer "low-emitting" building materials as pertains to indoor air quality, industrial hygiene, and sanitation In addition, the faculty will develop companion curricula that teach skills in quantitative methods, economic analysis, and social science research competencies required for careers supportive of green initiatives, including: Urban and regional planning; Cost-benefit analysis of alternative construction materials or energy systems; Economic impact studies on green building development; Alternative land usage laws, zoning codes, and tax policies; and Public opinion and cultural preferences.

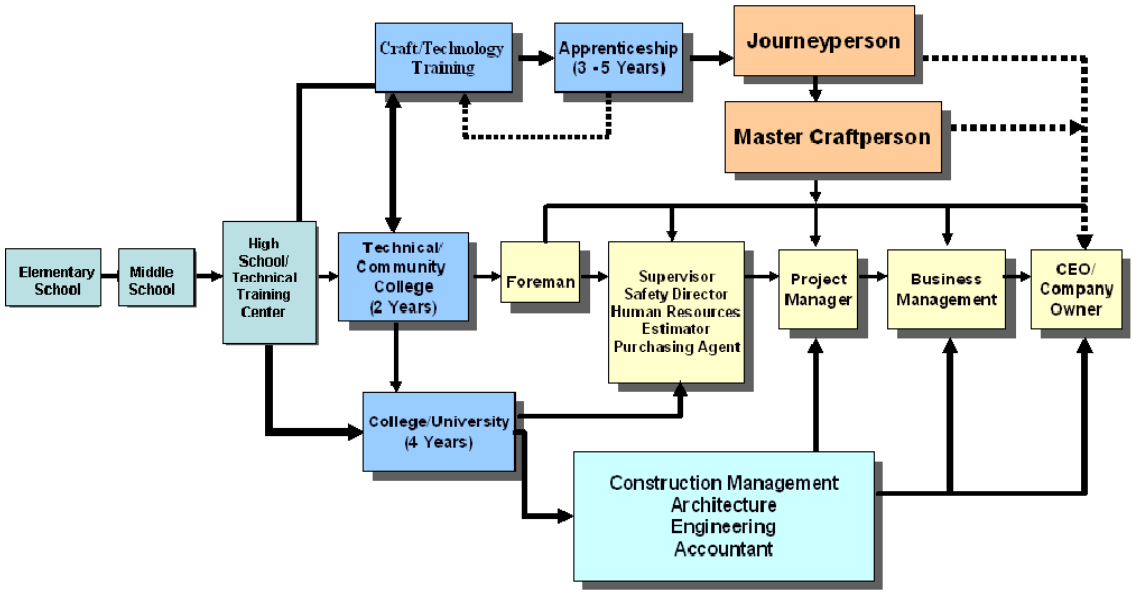
Two vital ancillary initiatives to be undertaken by the GBI at FSC are:
• The production and creation of a clearinghouse/repository in the College Library for print, electronic and web-based materials on green buildings and environmental sustainability. The curricula designed through the GBI will feature components that teach students how to identify and access electronic and paper information resources so that they can keep up-to date in fast-changing fields.
• Information-sharing and education via conferences, video-conferences, small project-based investigative team meeting, public seminars, expositions, and demonstrations using facilities on the campus of FSC

By collaborating together, the faculty involved in this project will design curricula and related learning experiences that will prepare a workforce ready to meet the needs of the expanding green jobs market while also advancing U.S. priorities with regard to sustainability. For example, one curricular focus is solar energy. FSC has considerable

expertise to share in this area. In 1992 the College became the site of the first utility scale photovoltaic demonstration project in the northeast USA. The Solar Energy Center at Farmingdale State College is accredited as a Training Institution and Continuing Education Institution on Solar Energy by the US Institute of Sustainable Power. Solar power and photovoltaic (PV) systems that harness the power of the sun to heat water or charge battery cells are forms of renewable power generation that will lessen carbon emissions. We propose to design curricula at various education levels that will produce a green workforce providing skilled professionals required for solar power installation, maintenance, development and manufacturing. Beyond the measureable objective of seeing 40 educators engaged in curriculum development that results in at least five new curricular components in the first year of activity, it is anticipated that a wide diversity of learning experiences will flourish each participating institution (FSC, EOC, BOCES, LI Works Academies), including: new courses created, new equipment introduced, new apprenticeship and internship opportunities provided to students, new modules introduced into existing courses, new pedagogies, new methods of assessing student learning, and new degree programs. Such curricula and learning experiences will ultimately be showcased and shared with a wider audience through publication and conference presentations by the participants and institutional representatives. An added benefit and anticipated outcome of the collaboration between high school, vocational education, and university faculty is that their coming together in work groups and their orchestration of curricula should serve to advance the creation of two seamless pipelines essential for the efficient production of workers of a green economy:

1. A pipeline that informs students about career options and pathways and guides them to achieve the required educational credentials.
2. A pipeline that sends students and graduates to industry and the nonprofit sector for internships, apprenticeships, and employment.

A simple career pathway map – such as the one below that diagrams the green job marketplace – sets forth the progression of educational development and career options that underlay the GBI's collaborative curriculum development project[2].



Actions and Activities

In order to achieve the primary objective of creating new curricula and learning experiences in the areas and at the education levels described earlier, the GBI will engage forty educators drawn from the four partners (FSC, EOC, BOCES, LI Works) in a yearlong series of activities that will include:

(1) Forty educators will be recruited to participate in six workshops/ seminars to be held at the FSC campus on: energy management, alternative energy, construction/architecture, horticulture, healthy buildings, economic analysis of cost and energy efficiencies. The workshops will feature guests from industry and experts in curriculum development and pedagogy.

(2) Ten of the participating educators will attend educational and industry conferences devoted to issues of sustainability and the green economy

(3) Forty GBI participants will attend a day-long conference at FSC devoted to pedagogy, student-centered learning, and assessment of learning outcomes

(4) Year-long electronic communication will be sustained between the 40 educators through social network discussions, videoconferences (including some with industry), email, a GBI website, and on-line Wiki discussions

(5) The forty participants will attend two training sessions offered by FSC reference librarians on print and electronic resources (CDs, Web Sites, and databases) in the curricular areas being developed.

(6) Fifteen of the participants will be involved in “Sustainability Curriculum Development” to research, design, and develop specific curricular components, integrated or linked courses, distinctive learning experiences, new laboratory exercises, etc. in diverse areas of study. For example, one individual or small team might focus on HVAC energy management while another would develop curricula related to green roofs.

Timeline and Methods Used To Obtain Results

Month	Activity
August 2009	Inform community of award. Meet to discuss plan of action and staff recruitment details arranged. Year-long electronic communication (EC) through social networking discussions, wikis, video conferences, webinars, email and GBI website begins (Electronic Communication).
September 2009	Development of program materials, brochures; begin staff training; finalize timeline; begin online meetings; data collection begins; staff meetings occur; recruitment of 40 participants; host day-long on campus conference on pedagogy, student centered learning and assessment of learning outcomes. EC continues; evaluation plan finalized
October 2009	Develop and finalize materials for curriculum development workshops/seminars for November sessions; Attendance at regional or national Educational and Industry Conferences; Sustainability Curriculum Development Stipends Awarded to faculty participants; data collected for evaluation, EC continues
November 2009	2 workshops on curriculum development on topics specified in the narrative; EC continues; Develop and finalize materials for curriculum development workshops/seminars for December sessions; Attendance at regional or national Educational and Industry Conferences; Sustainability Curriculum Development Stipends Funds Awarded to faculty participants; data collected for evaluation

Month	Activity
December	1 workshop on curriculum development on topics specified in the narrative; EC continues; Attendance at regional or national Educational and Industry Conferences; data collected for evaluation
January 2010	Attendance at regional or national Educational and Industry Conferences; EC continues; data collected for evaluation
February	Develop training session material for library training sessions; Develop and finalize materials for curriculum development workshops/seminars for March sessions; Attendance at Educational & Industry Conferences; EC continues; data collected for evaluation
March	2 workshops on curriculum development on topics specified in the narrative; EC continues; Training sessions by reference librarians on print and electronic resources Develop and finalize materials for curriculum development workshops/seminars for April sessions; Attendance at regional or national Educational and Industry Conferences; data collected for evaluation
April	1 workshop on curriculum development on topics specified in the narrative; EC continues; Training sessions by reference librarians on print and electronic resources; Attendance at Educational and Industry Conferences; data collected for evaluation
May	Conference featuring Sustainability Curriculum Development awardees and their products; Attendance at Educational & Industry Conferences; EC continues; data collected for evaluation

June	Attendance at regional or national Educational and Industry Conferences; EC continues; data collected for evaluation; Evaluation reports compiled
July	Attendance at Educational and Industry Conferences; EC continues; Evaluation reports reviewed and updated
August 2010	Attendance at Educational and Industry Conferences; Electronic Communication continues; Evaluation updated
September – December 2010	Final Reports and Evaluation updated and any reports required by the US Department of Education are completed.

Conclusion

It is expected that most of the new curricula and learning experiences emanating from this project will only be fully implemented after the funding period has expired. In subsequent years, we expect to see more students enrolled in "green studies" offered by LI Works-supported Environmental Career Academies at the high school level, BOCES and EOC training in green areas, and new courses and degree programs at FSC. As green industries grow, communication and collaboration between educators and industry representatives will increase. Ultimately, the pipeline of students enrolled in the new curricular tracks will yield a large green industry on Long Island that employs a significant proportion of the work force.

Bibliography

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