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Combining green design with improvements in student health and productivity is a research goal in UO study

Research in architecture needs to combine clinical and technological approaches according to University of Oregon architecture associate professor Ihab Elzeyadi. Multiple grants have been awarded to support his research in sustainability for educational facilities and green classrooms that have the ability to help improve student productivity, health, and academic performance.

Elzeyadi is the recipient of the American Institute of Architects (AIA) Research Grant in 2008 for his research, titled "The Green Classroom Toolbox." His two-phase project focuses on the gathering and analyzing of information to provide evidence-based design guidelines for architects and designers to use when retrofitting educational facilities for carbon neutrality and to improve students' health and academic performance. He will present this research at the Architectural Research Centers Consortium (ARCC) "Leadership in Architectural Research" conference in San Antonio, Texas on April 15, 2009. Other venues where Elzeyadi will be presenting his research are the Solar 2009 annual conference in Buffalo, New York on May 13, 2009, as well as the Passive and Low Energy Architecture (PLEA) conference in Quebec City, Canada on June 22, 2009. Other presentations at international conferences will follow later next fall.



Using a triple bottom line approach, Professor Elzeyadi looked at environmental, energy, health, and academic performance impacts of classroom design. He believes architectural research should incorporate multi-disciplinary methods from the fields of medicine, educational psychology, and engineering in order to advance an evidence-based design discipline. Each of the strategies used in his recommended guidelines is

supported with evidence for their impacts on the triple bottom line of people, profit, and planet. Elzeyadi said, "The hope is that this research findings informs future classroom designs and retrofits to green our aging schools, which are energy and environmentally unconscious. Under the American Recovery and Reinvestment Act of 2009 (ARRA), school districts will have access to federal funding to modernize and green their schools. Our study will provide school designers and officials with the needed guidelines to direct this process the right way. It will act as a decision support system."

Professor Elzeyadi, with funding from AIA and the University of Oregon, has

completed Phase 1 of his project and has received a Summer Research Award from the University of Oregon to research Phase 2 entitled, "BELS: Bench-marking and Performance Evaluation for LEED Schools."

The first phase provides evidence-based classroom retrofit guidelines for Eugene, Albany and Salem, Oregon. He analyzed data from multiple simulations of retrofit designs as well as a large meta-analysis of studies linking the impact of the proposed retrofits on student's health and academic achievements. He synthesized the data into a set of developed guidelines that address the most critical needs and have major impacts on the triple bottom line scenario. He admits that with retrofits of classrooms, "you can't drastically change poor early design decisions, but our analysis shows that some minimal retrofits in the classroom envelope, daylighting, and controls can have drastic impacts on the triple bottom line." He hopes to expand his research to the entire Oregon climatic zones, the Northwest and several other climates throughout the United States with future funding.

As a finished product, "The Green Classroom Toolbox" will be available online, in print form and contain software with small easy-to-use applets. Phase 2 will be available in a report and website by the spring of 2010. "The Green Classroom Toolbox" will reduce time for designers and ultimately lead to more efficient classrooms. Elzeyadi said, "The Green Toolbox Classroom" will help teachers teaching and children learning as well by making their classroom a regenerative lesson."

Professor Elzeyadi has also received funding from the 2009 Mulvanny G2 Faculty Research Award to research a similar subject entitled, "GATE: Green Affordable Teaching/Learning Environments." This award will allow Professor Elzeyadi to further apply the knowledge gained from his previous projects to the field. He is working with several UO architecture alumni to implement the guidelines into specific case study sites in Eugene, Oregon, New Orleans, Louisiana, and San Diego, California. This project will build on the lessons learned in Phase 1 of the "Green Classroom Toolbox" and provide field evidence for its application.

Professor Elzeyadi is the first recipient of the newly created MulvannyG2 Faculty Research Award. The \$10,000 award was created in 2008 by one of the largest architectural firms in the Pacific Northwest, MulvannyG2, headquartered in Bellevue, Washington, to support high-caliber inquiry and creative practice.

About the University of Oregon

The University of Oregon is a world-class teaching and research institution and Oregon's flagship public university. The UO is a member of the Association of American Universities (AAU), an organization made up of 62 leading public and private research institutions in the United States and Canada. The University of Oregon is one of only two AAU members in the Pacific Northwest.

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