

Development of a Revit Energy Modeling Teaching Module for Sustainable Construction Courses

Anderson M. Lewis
Colorado State University
Fort Collins, Colorado

Possessing knowledge and skills on how to use Building Information Modeling (BIM) Energy Modeling (EM) software tools can be a valuable in the construction industry. BIM EM allows users perform Life Cycle Cost Analysis by giving them the ability to analyze and compare the cost and energy implications of multiple different building configurations in a short amount of time. This paper introduces the development of a Revit EM teaching module and examines its effectiveness in familiarizing students with the capabilities, limitations, and inputs required of this software. The EM teaching module is an instructor led in-class assignment that is designed to: expose students to capabilities of current energy modeling tools and practices; demonstrate energy modeling processes and input requirements to provide context for processes and results; and provide opportunity to virtually compare and contrast potential energy impacts of design and construction changes. The instructor guides students through the process of creating a building element based energy simulation for two different locations. Each location has a base run, an improved insulation run, and an improved window-glazing run. The students are then expected to repeat the EM process for additional location as homework and answer a question set based off of their EM results. The question set draws from concepts students learned in their sustainable construction course. By using the energy modeling results the students become familiar with reading and analyzing the EM outputs. Students are encouraged to apply concepts previously learned in their sustainability course to justify their answers. A post survey is sent out to assess how well the learning objectives were met for the students. This study aims to show that although students have varied experience with BIM tools such as Autodesk's Revit, this assignment helps familiarize students with its capabilities. Students also become more acquainted with component-based energy modeling tools and their uses. Students are able to see some of the inputs that go into creating an energy model in Revit as well as are given the opportunity to compare and contrast energy impacts of construction and design changes. This teaching module can act as a template for implementing introductory Revit EM teaching modules to sustainable construction related courses.

Key Words: Energy Modeling; Sustainable Construction; Teaching Module; Construction and Engineering Education