

Using Blogs and Labview and Lego Robotics in a Freshman Seminar Course to Teach about Sustainability Concepts

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Sustainability at Suffolk is freshman seminar course that explores the science of sustainability and contemporary issues related to sustainability; and has the students develop an experiment that teaches other Suffolk students about energy and sustainability. The goals of the course are: to provide students with a context for learning how to frame and solve complex problems using an integration of science, engineering and the humanities; how to do independent research and work in teams, and how to communicate complex scientific issues to others by blogging, and by designing an experiment. To that end, the students' final project is to design a lab activity that teaches about the science of sustainability which they instruct to students of another class.

The 2.5 hour class meeting time contains not only lectures about sustainability issues and the science behind them but also a ~1 hour hands-on activity using Labview and Lego Robotics that teaches mainly about sustainability concepts but also some robotics as well. The activities included building a car-robot and programming it to perform certain tasks to learn about concepts such distance, velocity, acceleration, as well as building and programming; a mass-pulley activity to learn about Newton's 2nd Law as well as energy and power concepts; a generator experiment that illustrates Faraday's Law; and a photovoltaic experiment where students explore the relationship between light intensity with output voltage and light frequency and output voltage.

Students are required to use blogs to post all their assignments which include not only the lab activity write-ups but also research assignments as well. Past assignments include blogs about the BP Spill, the Fukushima nuclear disaster, and Demand Response. Students are also required to comment on their classmates' blogs as well. In that manner, a community of students who are concerned and knowledgeable about sustainability issues is created. The use of blogs allows students to be creative in explaining their work and their research with the ability to incorporate media into their reports and also allows them to learn from the work of other students in the class.

The last month of the course is spent working in teams, on designing a laboratory exercise for another Suffolk class that relates to the science of sustainability where the students of Sustainability at Suffolk serve as the instructors for that lab to other Suffolk students in another class. The teams develop a handout for the lab where they ask students to record and analyze their findings. The teams also give ten minute power point presentations to both the Sustainability at Suffolk and the class that they teach. All the work having to do with this final experiment including an analysis of how the experiment went and how it could be improved is written up, also in the students' blogs.

The course also includes two field trips to such places as the MIT nuclear reactor, the Hull wind turbines, and the Museum of Science, as well as a guest lecturer who demonstrates unusual devices such as the Peltier Device, the Mendocino motor, and the Sterling Engine.

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