

2009

Sustainability Course Modules for Information Systems and Interdisciplinary Courses

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Recommended Citation

Dwyer, Catherine and Gomez, Elizabeth Avery, "Sustainability Course Modules for Information Systems and Interdisciplinary Courses" (2009). *AMCIS 2009 Proceedings*. 79.

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Workshop Proposal for AMCIS 2009

Submission Date:	2/20/2009
Workshop Title:	Sustainability Course Modules for Information Systems and Interdisciplinary Courses
Duration:	() Full Day (X) Half Day

Abstract

This workshop will demonstrate how the development of curriculum for sustainability can become a strategic opportunity for IS departments. We will discuss our efforts to introduce modules to existing IS courses that target sustainability and energy literacy. Sustainability, first identified as a characteristic of eco-systems, is the capacity to maintain a process indefinitely. The UN Commission on Environment and Development defines sustainability as the ability to meet “the needs of the present without compromising the ability of future generations to meet their own needs.”

Sustainability has gained significant public and government attention, such as global warming, decreasing energy supplies, and increasing food costs. Many colleges and universities have received positive notice for their greening efforts. In many respects, the academy is expected to be a leader in efforts to improve sustainability.

We argue the growing emphasis on sustainability is a strategic opportunity for information systems. Many IS themes are highly relevant to sustainability. There are global, social, technical, and cognitive components that all impact on the use of natural resources. Social behaviors must be changed as a result. For example, an individual’s energy consumption is directly related to their interaction with technologies that both rely on and control energy use.

Workshop Co-Leader Information

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Speakers' background, description of workshop, and envisioned activities during the workshop (please provide information for each speaker)

Catherine Dwyer's Background:

Dr. Catherine Dwyer is a member of the Pace University faculty and a social media consultant with over twenty years experience in the IT field. She is an internationally recognized scholar whose research on privacy management in social networking sites has been referenced in media outlets such as The New York Times, The Washington Post, The St. Louis Post Dispatch and Computerworld.

Inspired by her husband's successful effort to build the [first solar panel](#) installation in a cooperative apartment building in New York City, Dr. Dwyer has been developing projects, class exercises, and homework assignments related to sustainability issues and energy use for the last two years.

Dr. Dwyer received the Distinguished Faculty Service Award in 2003 for her development of an online computing literacy curriculum. She has also served as a faculty leader for numerous conferences and events that promoted science and technology careers to high school girls. For more information on her research go to <http://csis.pace.edu/~dwyer>.

Elizabeth Avery Gomez's Background:

Dr. Elizabeth Avery Gomez is a faculty member in Information Systems at New Jersey Institute of Technology. For over 25 years she has been an information systems specialist working with fortune 100 companies on multi-platform projects.

Dr. Gomez conducts research on ways to adapt communication protocols in support of today's mobile technologies for improved communication response readiness (<http://www.ereadiness.org/>). Special emphasis is placed on the crisis management domain and assisting communities of need through the use of technology, especially diverse populations with limited economic and technological resources who need training for a sustainable workforce. Dr. Gomez's research on plain language training adapted for communication with SMS text-messaging has been recognized internationally and also in press at outlets such as MSN top stories, Atlantic City Press and University Business.

Description of Workshop:

The goal of the workshop is to introduce a selection of sustainability modules that can be included in a course, or combined and expanded for a new interdisciplinary course on Sustainability.

We will present a half-day workshop with topics, readings, assignments, and class exercises for sustainability that have been developed over the past two years. The material we will present will involve cases that have already been tested in a college classroom at least twice. We will present the assignments, show samples of student work, and report based on student reflections as to their learning experience and outcomes from these cases.

Improvements in reducing greenhouse gas emissions and energy use will depend on profound changes in the behavior of millions of people. There are many complexities related

to the state of energy use. Understanding these complexities can depend both on quantitative analysis and knowledge of general energy use patterns.

Planned Activities:

Part 1: The Alignment Between Sustainability and IS

We will begin the workshop with a discussion of the potential alignment of sustainability topics with IS concepts and courses. For example, firms must carefully consider their supply chain in order to accurately determine the full carbon footprint of business processes. Often firms look only at their individual processes, and not at the origins, firms must analyze each step of their supply chain to determine patterns of energy use. For example, an electricity generating company will have a large carbon footprint, but they are creating that energy for their customers. How should the carbon footprint be calculated and shared all along the supply chain?

Part 2: Presentation of Sustainability Course Modules

In this section, we will present sustainability course material that we have used over the past two years in a variety of courses. Here is partial list:

Evaluating the Potential for US Energy Independence

An extensive resource of US and international energy stocks, use, and emerging trends is publically available at the Energy Information Agency (EIA), part of the US Department of Energy (see <http://www.eia.doe.gov/>). This section consists of a number of Excel exercises and assignments that analyze patterns of energy use. Here is a brief summary of exercises that have been developed and tested in a classroom setting:

- **US Oil Production Versus Consumption, 1980-2007.**
This exercise provides an analysis of trends in US oil production versus oil consumption. Data obtained from the EIA is used to document the decline in US production, alongside the increase in US consumption. You can view the exercise by accessing this [link](#).
- **Data Visualization Exercise: Using Excel to Graph Trends in Energy Consumption**
Information systems professionals must be able to use graphical tools to communicate quantitative data to stakeholders. One of the most accessible ways of doing this is through the use of Excel Charts. In this exercise, students are given a significant amount of data, much more than they could present to a client. Their task is to select sections of relevant data, and use the charting function in Excel to create compelling charts. You can view the details of this assignment through this [link](#).
- **Analysis of US Energy Independence**
This assignment is an extension of the exercise described in step 2. Students work in teams of two to prepare a presentation based on the EIA projection of US energy use from 2007 through 2028. This assignment exposes students to an official projection, one that they may be asked to help develop as an IS professional. The general instructions for this in-class exercise are at this [link](#), and the data for this assignment

can be found at this [link](#).

Understanding information technologies contribution toward sustainability

Information technologies when implemented strategically can aid sustainability efforts. This section consists of a number of information system application initiatives. Here is a brief summary of exercises that have been developed and tested in a classroom setting:

- **Corporate buildings and IT resource allocation and reduction**
This assignment had two objectives: a) to develop a systematic approach that could measure and improve current IT usage within corporate buildings. To complete the assignment student used an information literacy approach to access digital library resources to increase awareness on current methods aimed at improving resource allocation and reduction; b) to develop an implementation plan for #a.
- **Training and awareness**
This assignment had two objectives: a) to develop a multimedia training application design document that will educate the home computing user on ways to reduce energy use for technology related devices. To complete the assignment student used an information literacy approach to access digital library resources to increase awareness on current methods aimed at reducing energy usage and computing resource allocation; b) to develop an implementation plan for #a.
- **Reaching communities of need through low-cost technology**
This assignment had two objectives: a) to develop a mobile application design document that will enable citizens who live in urban areas an opportunity to participate in healthy living activities offered for an improved and sustainable community. To complete the assignment student used an information literacy approach to access digital library resources to increase awareness on mobile device applications and potential community activities that target healthy living; b) to develop an implementation plan for #a.

Part 3: Discussion of potential research topics

We will conduct a discussion of the potential for academic research on sustainability and information systems. Drs. Dwyer and Gomez will present an update on their research in progress investigating **Energy Literacy**.

We define Energy Literacy as a cognitive construct that measures levels of individual energy awareness, such as the relationship between personal energy use and sustainability. A person with a high level of Energy Literacy will be able to accurately describe energy issues, be able to explain the impact of energy policy on sustainability, and be able to compare the benefits and costs of energy alternatives.

There is growing consensus that demands for energy will continue to increase while dependable sources of supply become scarcer. Any significant shift in overall energy use will require a shift in the attitudes and behavior of individuals. Even if practical alternatives to fossil fuel exist, their ultimate adoption will depend on changes in individual behavior.

What factors influence the willingness of individuals to change their patterns of energy use and 'go green?' Long term sustainability will require a commitment from individuals to make changes in their energy use and carbon footprints. What factors can influence whether an individual changes their behavior?

The purpose of this research has been to study the relationship between Energy Literacy and intention to change behavior. Because energy use is such a complex subject, a hypothesis of this research is that a deeper understanding of energy use is achieved when the individual studies the problem aided by a computer supported data analysis tool such as a spreadsheet.

To what extent does an individual's ability to use data analysis tools to examine energy use increase their energy literacy, and their intention to change their energy use habits?

Sustainability will require a commitment from individuals to make changes in their energy use and carbon footprints. What factors can influence whether an individual changes their behavior?

The goal of The Energy Literacy Project is to study Energy Literacy and its relation to change in behavior. Does the use of technology mediated analysis tools such as Excel increase Energy Literacy? Is there a relationship between increased Energy Literacy and intention to reduce personal energy use?

Materials for this project were piloted in Spring 2008, and were included in three classes of undergraduates in a basic computing literacy course during Fall 2008, and one section of an honors interdisciplinary computing course in Spring 2009. We will provide a summary of our findings to date at the workshop.

Special Requirements

We will require regular equipment (a computer, projector and screen), and Internet access.

Computers

Internet Access

Others, Please specify: _____

Audience

Insert a description of likely participants

Likely participants are IS faculty that are interested in added sustainability cases to their IS curriculum, and develop inter-disciplinary sustainability courses. We also expect this workshop may appeal to department chairs and school deans who are investigating ways to integrate sustainability topics into their curriculum.

Maximum number of participants: 35-50