In recent years faculty, educators, and web designers at the University of Toledo have been engaged in education initiatives related to climate change. This presentation will summarize these efforts and provide specific examples of educational products and outcomes developed to date from this work. In 2009 two faculty developed and taught a Distance Learning online undergraduate course on climate change that has subsequently resulted in three course offerings to a total enrollment of 125 students. This course was designed to engage and interest students in a range of climate change topics covering both the natural science and policy aspects. In 2010, faculty, educators, and web designers at the University of Toledo were engaged in education initiatives to develop an extension of this course to include the policy aspects of climate change and provide such learning materials to local high school science programs.

New undergraduate course in Climate Change

In 2009 the Center for Teaching and Learning at the University of Toledo awarded a course development grant in support of new introductory course in climate change to be offered jointly between Geography and Environmental Science.

The climate change course is designed for online Distance Learning format using the Blackboard platform. The course is organized around five learning modules each consisting of three topics with each focusing on a school multiple choice quiz and each module also includes an assignment and a discussion board that requires posts and replies to a module related question. The course is open to all students with no prerequisites and is a requirement for the new undergraduate minor in renewable energy as well as meeting major requirements for the BA Geography and BA/BS Environmental Studies/Science degrees.

Each learning module is self contained and allows for self paced learning over a three week period. All course materials are housed and organized with the Blackboard course webpage including the syllabus, a welcome page and FAQ pages that provide an introduction and background for the course assignments and schedules. A discussion board is allowed for posting of course options and questions from students. The course covers the range of climate change topics from the basic physical science through impacts, mitigation, and adaptation.

Overview

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A typical topic page (see example on right) consists of an overview to introduce the topic in the course. Learning outcomes are provided to the student at a course level of the learning objectives and facts. A learning module consists of an online assignment (e.g., required readings, a course textbook, online, and the J2020 IRP Report (Feinstein for Policy Considerations)) on a required reading for the topic. Each topic consists of a series of week links and additional links, both intended to supplement the readings.

As part of the module learning evaluation (grading), each topic has one assignment related to the topic. Green and red included to provide feedback and detail. An assignment generally provides overview of an issue, often providing a case study or topic in which the student complete a set of tasks or questions examining key questions presented within the topic.

Another important aspect of the course is the discussion boards posts assigned to each module. The interactions post a question to which each student must post an original reply and two completion specific replies to other student posts. This encourages active learning among the students and also allows for the interaction component of the learning experience.

With three course offerings since 2009, 125 students have completed the course with an average mean final grade of B, and student evaluations generally positive.

LEADERS: Climate change course for teachers in MA Education program in renewable energy

This program is designed to provide graduate degrees in Education focusing on aspects of renewable energy, including the related aspects of climate change.

The climate change course for the LEADERS MA Education program is a part of a blended classroom/online course using Science Cafe as the primary venue for course delivery. The course is designed to engage, educate, and enhance the climate change awareness, providing opportunities to develop critical thinking, science literacy, and hands-on learning through Project Possibility Frontier (PPF). The course syllabus from the semester 2011 offering is shown in full. A total of 131 students enrolled the online course in 2011.

During each class day with the LEADERS teachers “in-class” learning activities are introduced to enhance the learning and to consider research which is being done in the classroom through online activities and tasks. The first above summary of classroom content is for the first week of the course where the focus was on basic understanding of the climate and atmosphere.

High School Learning Modules to address common climate change misconceptions

The aim of this project is to develop learning modules for high school students to examine common misconceptions regarding climate change.

The model will clearly demonstrate that uncertainty can be incorporated into the benefit cost analysis (BCA) and highlight that the only remaining debate among environmental economists is how much reduction how soon? For every “dirty job” that is lost, there is a “clean” job created in the knowledge economy. In Figure 1, example Possibility Frontier (PPF) illustrates the trade off, e.g., the news from pt. A on the PPF to pt. B.

“Individuals cannot make a difference” is a misconception often held by students. This misconception is related to the physical capacity of the individual to make changes. In reality, there is nothing they can do, they might not think about any actions or ways they can help reduce greenhouse gas emissions. To be able to consider this question, students and teachers will have to first investigate how their actions and lifestyle may or may not contribute to global climate change through a personal carbon calculator.

In this module, students will analyze climate variation in North America and its impact on vegetation in the local region. The project is designed to provide a face-to-face experience for those who do not live in the area of North America. During the 20th century the climate of the Great Lakes basin has experienced the impacts of varying water inputs and demands as well as increasing temperature/precipitation systems.

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