

# **Facilitator's Guide**

## **Sustainability: For Hawaii and Beyond**



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# Table of contents

<b>Introduction</b>	<b>3</b>
<i>Locus of control</i>	<b>3</b>
<i>Overall description</i>	<b>4</b>
<b>Facilitator's Guide</b>	<b>5</b>
<i>Content</i>	<b>5</b>
<i>Context</i>	<b>6</b>
<i>Implementation</i>	<b>6</b>
<i>Sample Week 2</i>	<b>8</b>
<i>Sample Week 3</i>	<b>9</b>
<b>Research</b>	<b>11</b>
<i>Web-based</i>	<b>11</b>
<i>Asynchronous</i>	<b>12</b>
<i>Synchronous</i>	<b>13</b>
<i>Summary</i>	<b>14</b>
<i>References</i>	<b>15</b>

# Introduction

## **Locus of Control**

Before starting a Master's program through UH Manoa in Educational Technology, I took every class UH Maui had to offer in sustainable energy. Following my completion of this program, I was hired as project coordinator for the Maui County Green Book the two years it was published. This publication is a resource to businesses and organizations that go above and beyond to promote sustainability in some way. Ranging from solar installation contractors to eco-friendly cleaners, I was afforded a sampling of everything that the island of Maui had to offer at the time. More importantly, I became educated on the pertinent issues we face to becoming sustainable as the most isolated archipelago in the world. These experiences have helped me to create a network of individuals focused on sustainability in the Hawaiian Islands, not just in energy, but water, waste, and food as well. This is an area that I am passionate about and I feel needs to be taught. It is especially relevant for Hawaii as we are dependent on outside resources for a few of these areas and the others are a growing concern.

## **Overall Description**

This paper is the proposal for an introductory level MOOC (massive open online course) on issues of sustainability in the Hawaiian islands and beyond. Although the focus of the course will be specifically the Hawaiian islands, most concepts are pertinent world wide. The course is designed to be the equivalent of a 3 credit class and will run approximately 12 weeks. There are 4 units covered; energy, waste, water, and food. These units are sectioned and take 2 weeks each. The remaining 4 weeks are for an introduction, work on the final project, and evaluation. The MOOC will be presented through a mix of web-based content, synchronous and asynchronous learning tools.

## Facilitator's Guide

### Content

8 weeks of content

Week #	Topic
Week 2	Energy 1 - Efficiency  Lighting, appliances, heating and cooling
Week 3	Energy 2 - Generation  Solar, wind, hydro, and geothermal
Week 4	Water 1 - Efficiency  Faucets, shower, toilets, landscaping, and grey water
Week 5	Water 2 - Management  Ground water, surface water, and reuse of treated water
Week 6	Food 1 - Agriculture  Biodiversity, pest control, land division, farmers markets and community farms
Week 7	Food 2 - Ranching and Fishing  Population control and management
Week 8	Waste Management 1 - Reduce, Reuse  Reduction of solid waste sent to landfill, composting, alternative use of waste

Week 9	Waste Management 2 - Recycle  What can be recycled, where, how recycled materials are used
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## Context

This MOOC is designed with the high school student in mind, grades 9-12. Although the target audience is high school students, the course may be applicable beyond it. It is expected that the learner has little to no knowledge of sustainability issues and concepts. The student also needs access to a computer with reliable internet access and be able to check the course website and email regularly. As a result of this course, it is expected that the learner will be able to recognize an issue in each of the 4 instructional units, as well as propose a potential solution.

## Implementation

Web-based content	Weebly course site including hosted videos and documents. Flash based simulations.
Asynchronous tools	Weebly discussion forum, surveys
Synchronous tools	Blackboard collaborate, Skype

The course is organized through a central website hosted on Weebly. Web-based content includes pertinent videos by leading professionals in sustainability, relevant readings on module topics, and flash based simulations. Synchronous sessions will take place through Blackboard Collaborate each week. Additionally, each week will have an assignment. Assignments are diversified to aid in learner engagement. These range from surveys, case studies, flash based simulations, discussion posts, and debates. These assignments will all be done asynchronously. In the final weeks, the students will be randomly distributed into learner groups to aid each other in the creation of their final project. Individuals may build upon, and use ideas presented in their learner group to complete this project and will be encouraged to synchronously chat over Skype. The format of the final project will be flexible in that it may be a paper, website, or video. The final project will cover concepts from each of the 4 modules. For student evaluation, peer reviews of final projects will take place, as well as an interactive quiz developed through Hot Potatoes software.

This class is designed to be both massive and open. This means that not only are all the tools utilized in this MOOC free, they have been selected specifically to accommodate the largest audience possible. One limitation of the tools chosen is that the synchronous meetings on Blackboard Collaborate must take place at a specific time on a specific day. The entry survey will reveal what time would be best for the maximum amount of students,

however, it is expected that some students will not be able to make the Blackboard meetings. To address this, all classes will be recorded and may be reviewed at any time. Additionally, the class is also designed so that a student can jump in at anytime. Aside from the last 3 weeks that deal with the final project and evaluation, each week can be taken individually. To review how the course is going, formative and summative evaluation will take place as student surveys during weeks 6 and 12.

The following is an outline for 2 units with a description of the learning activities that will take place.

### Week 2 - Energy 1: Efficiency

- Reading hosted on Weebly (web-based, asynchronous) - Readings on energy efficiency in the home will be provided to the students. The content will cover lighting, appliances, heating and cooling. This content will be posted on the site from week 1 and it is expected that the student has reviewed the material prior to the class meeting.
- Class meeting over blackboard collaborate (synchronously) - The class as a whole will meet at a set time on Blackboard Collaborate. For



those who are not able to attend, the session will be recorded for review at their convenience.

- The week's assignment will include a flash animation simulation on enhancing energy efficiency in the home (web-based) - The student will be presented the simulation of a home with various appliance and lighting situations, then, be able to replace each with different options. Results in varied power consumption, cost reduction, and estimated return on investment.
- Discussion forum post reflection and peer responses (asynchronous) - The student will post to the discussion forum on the class website with their thoughts on this week's material and the results of their simulation. They can respond with what did and did not work well for them and what they learned. Toward the end of the week after everyone has submitted their reflection post, students will be required to respond to at least 3 other peers using the I heard, I noticed, I saw format.

### Week 3 - Energy 2: Generation

- Reading and video hosted on Weebly (web-based, asynchronous) - Readings and a video on sustainable generation of electricity will be provided to the students. This will cover solar power, wind, hydro, and

geothermal. This content will be posted on the site from week 1 and it is expected that the student has reviewed the material prior to the class meeting.

- Class meeting over blackboard collaborate (synchronously) - The class as a whole will meet at a set time on Blackboard Collaborate. For those who are not able to attend, the session will be recorded for review at their convenience.
- Discussion / debate on forum - Students will respond to the material in one of three sections: I feel sustainable energy generation is the responsibility of individuals, the utility, or a combination. Toward the end of the week students will respond to at least one peer in each of the other categories. The responses are meant to be thoughtful and to provide an reasoning for why it should be a different way. Discussion is encouraged to continue from there but not required.

## Research

### Web-based content

Web-based content makes up a significant part of this MOOC serving to distribute information as well as engage the learner. Course information, text based pdfs and videos are all provided through the course website and can be accessed anytime by the students. Additionally, some of the activities provided are also web-based. Included in the class, are a few flash based simulations in which the student will be able to actively engage a problem. This web-based content can help to enrich the learning experience. These tools help to promote an active learner according to Asselin and Moayeri (2011).

Although web-based content increases flexibility, there are a few things to keep in mind for implementation into a class. Floyd, Hughes, and Maydosz (2011) supply 5 tools to help guide the use of web-based material in a class, all of which are address in some way within the design of the MOOC. They are as follows:

- "1) Be aware of web -based student's performance and perceptions
- 2) Create social presence through discussion groups and collaborative outcomes
- 3) Moderate your presence

- 4) Include problem-based learning
- 5) Provide optimal feedback".

Additionally, it is important to consider learner characteristics to deem whether or not this style of learning is appropriate. A study done by Chen and Tseng (2012) provides some insight into some of the traits of successful online learners. The perceived usefulness and motivation were seen as the two most important factors in the learners acceptance of a web-based course (Chen & Tseng, 2012). Furthermore, an anxiety about use of the web-based materials negatively impacted the experience.

### **Asynchronous tools**

Asynchronous tools and activities also allow for a greater flexibility in terms of accessing course content and completing assignments. This MOOC has many utilized throughout the class. A majority of asynchronous activity is centered around the class discussion forum found on the Weebly site. There are also 3 asynchronous surveys throughout the class for use as assessment measures. Hrastinski (2008) found that although students appreciated the greater flexibility of asynchronous learning, they also found it necessary for structured discourse. The instructor plays a valuable role in motivating students to engage in such discussions. A study done by Ajayi (2010), revealed that teachers that were participating in asynchronous learning felt that discussion forums were a great tool for structuring

discussions found necessary in previous research. Interestingly, when taken comparatively to synchronous learning, Mabrito (2006) revealed that students learning asynchronously spent more time responding to discussions than their counterparts. These results also implied that the asynchronous discussion promoted a deeper level of reflection.

### **Synchronous learning**

Synchronous learning makes up the smallest portion of this MOOC yet certainly not the least important. As Stewart, Harlow, & DeBacco (2011) discuss in their paper, dynamic learning occurs when students and educators interact simultaneously. Synchronous classes will be held weekly over Blackboard Collaborate and the students will be expected to attend if they are able to. Additionally, students will be encouraged to interact over Skype throughout the class and importantly for their final projects. Teachers are encouraged to use features of Blackboard such as the polling feature which students have been shown to favor (Hudson, Knight, & Collins, 2012). Michels and Ching-Wen (2011) provide a few suggestions in their paper to improve the experience of synchronous learning such as the teacher adding stories and humor to the presentation. It has been suggested, that although tools such as Blackboard are excellent synchronous learning tools, courses should also utilize other methods of instruction such as wikis or blogs to be comprehensive (Hudson, Knight, & Collins, 2012).

## Summary

This proposed MOOC utilizes educational tools that are web-based, asynchronous, and synchronous. It is designed with these different tools to maximize student engagement. Each has their own advantages and together they create a well rounded course.

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