Weaving the Environment into the College Curriculum

August 31, 2012
Maine Maritime Academy

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Acknowledgements

CETA
CENTER FOR EXCELLENCE IN TEACHING AND ASSESSMENT

i’m meSSI!
maine’s sustainability solutions initiative
Outline

I. Four models for placing the environment into curriculum

II. Curriculum development for environmental awareness

III. The central role of outcomes assessment to success

IV. The motivation
I. Four Models

1. Whole Curriculum model
   - Transformative approach – involves all programs
   - Example: Otago Polytechnic in New Zealand
   - Arizona State University – Global Institute of Sustainability
Education for Sustainability at Otago Polytechnic

The skills and values of Otago Polytechnic graduates contribute to every sector of society. Our curriculum, teaching and learning therefore is pervasive and influential with global impact. The Otago Polytechnic sustainability vision is that our graduates, our practitioners and our academics understand the concepts of social, environmental and economic sustainability in order for them to evaluate, question and discuss their role in the world and to enable them to make changes where and when appropriate. Our goal is that every graduate may think and act as a “sustainable practitioner”.

1865 THE UNIVERSITY OF MAINE
Four Models

1. Whole Curriculum model

2. General Education model 1 – dedicated courses
   - Popular in beginning in 1990s
   - Dedicated (usually first year courses) some of which are environmentally focused
   - Stimulated by Talloires Declaration
   - Became known as Education for Sustainable Development (ESD)
THE TALLOIRES DECLARATION

We, the presidents, rectors, and vice chancellors of universities from all regions of the world are deeply concerned about the unprecedented scale and speed of environmental pollution and degradation, and the depletion of natural resources.

We, therefore, agree to take the following actions:

1. Increase Awareness of Environmentally Sustainable Development
2. Create an Institutional Culture of Sustainability
3. Educate for Environmentally Responsible Citizenship
4. Foster Environmental Literacy For All
5. Practice Institutional Ecology
6. Involve All Stakeholders
7. Collaborate for Interdisciplinary Approaches
8. Enhance Capacity of Primary and Secondary Schools
9. Broaden Service and Outreach Nationally and Internationally
10. Maintain the Movement

Institutionalized as University Leaders for a Sustainable Future
http://www.ulsf.org/programs_talloires.html
Four Models

1. Whole Curriculum model
2. General Education model 1 – dedicated courses
3. General Education model 2 – distributed courses
   - Menu approach
   - Convert existing courses to reflect additional environmental learning outcomes
   - UMaine model
Student Learning Outcomes

Upon completion of general education study in the area of Population and the Environment, students will be able to:

• **Think** in an informed and critical fashion about human population and the human impact on the natural environment through an understanding of ecological systems.

• **Understand** the role of both local and global environmental change on the quality of human life.

• **Assess** the manifold role of human population growth on environmental quality and the quality of life, both in industrial and developing countries.

• **Analyze** the influence of cultural, religious, economic, educational, and political factors on population growth and environmental quality.

• **Evaluate** possible solutions to population/environment problems, which may include the role of technological advancements, a reexamination of educational and political institutions, enlightened reassessment of traditional religious and economic conceptions, and rethinking of the contemporary Western conception of "the good life".
Four Models

1. Whole Curriculum model
2. General Education model 1 – dedicated courses
3. General Education model 2 – distributed courses
4. Dedicated Major model
   • Typically interdisciplinary, draws from multiple units’ strengths
Four Models -- Strengths

1. Whole Curriculum model
   • Embeds environmental issues into the fabric of the institution

2. General Education model 1 – dedicated courses
   • Emphasizes environment for students as part of their formative academic experience

3. General Education model 2 – distributed courses
   • Least cost to implement and requires least faculty buy in

4. Dedicated Major model
   • Attracts new student type
Four Models -- Weaknesses

1. Whole Curriculum model
   • May be difficult for some programs to “make sense” of the model, eg. Otago and nursing?

2. General Education model 1 – dedicated courses
   • Requires faculty commitment dedicated to gen. ed. program, asks little else from rest of faculty

3. General Education model 2 – distributed courses
   • Requires least faculty buy in therefore tends to have less systemic impact

4. Dedicated major model
   • Considerable resource commitment – new or opportunity cost
II. Curriculum Design for Environmental Courses – Dee Fink Model

A Self-Directed Guide to Designing Courses for Significant Learning

L. Dee Fink, PhD
Director, Instructional Development Program
University of Oklahoma

Author of *Creating Significant Learning Experiences in College Classrooms*
Design for Environmental Curriculum – Dee Fink Model

The Key Components of INTEGRATED COURSE DESIGN

- Learning Goals
- Teaching and Learning Activities
- Feedback & Assessment

Situational Factors
Course Design for Environmental Courses – Dee Fink Model

The Key Components Of INTEGRATED COURSE DESIGN

Learning Goals

Teaching and Learning Activities

Feedback & Assessment

Situational Factors
III. Assessment Imperative

- Outcomes assessment as a Deming Cycle
- Course or program as unit of analysis (not student)
- Assessment targets
  - Job placement/employer surveys
  - Factual information -- before/after testing
  - Skill development – before/after testing
    - Problem solving/critical thinking
    - Quantitative reasoning
    - Communication
  - Values – before/after testing
Example: Values as Assessment Metric

• Curricula have “values” component
• Values Change as Measure of Course or overall curriculum effect
• Otago Polytechnic whole curriculum model
• UMaine individual Course model
• New Ecological Paradigm (Revised NEP) as metric
NEP (revised)

Item
1. We are approaching the limit of the number of people the earth can support.
2. Humans have the right to modify the natural environment to suit their needs.
3. When humans interfere with nature it often produces disastrous consequences.
4. Human ingenuity will insure that we do not make the earth unlivable.
5. Humans are seriously abusing the environment.
6. The earth has plenty of natural resources if we just learn how to develop them.
7. Plants and animals have as much right as humans to exist.
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
9. Despite our special abilities, humans are still subject to the laws of nature.
10. The so-called “ecological crisis” facing humankind has been greatly exaggerated.
11. The earth is like a spaceship with very limited room and resources.
12. Humans were meant to rule over the rest of nature.
13. The balance of nature is very delicate and easily upset.
14. Humans will eventually learn enough about how nature works to be able to control it.
15. If things continue on their present course, we will soon experience a major ecological catastrophe.
NEP

• Can be used to construct a “psychometric” scale
• New Ecological Paradigm as opposed to Dominant Social Paradigm
• Likert Scale to respond to 15 items
• Scale -33 ("brown") to +27 ("green")
• Used in before/after testing
• Example from one of my classes…
NEP Change by Student

Pretest Mean = 4.7
Posttest Mean = 7.5
Change in Individual NEP Scores

What Does This Mean for Assessment?
Closing the loop

• Outcomes assessment in Deming Cycle
  – Identify learning outcomes
  – Establish Pedagogy to accomplish those outcomes
  – Assess
  – Revise outcomes and/or pedagogy
  – Repeat

PDCA -- plan → do → check → ↓

↑ act ←
Journal Resources to Help Think About Environment in Curriculum

• Journal of Environmental Education
• Environmental Education Research
• International Journal of Sustainability in Higher Education
• Journal of Environmental Studies and Sciences
IV. The Motivation

• Why build the environment into the MMA curriculum?
IV. The Motivation

Article
Will Steffen, Paul J. Crutzen and John R. McNeill

The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?

Ambio Vol. 36, No. 8, December 2007
The Great Acceleration

From Steffen et al., 2007
p. 617

Figure 2. The change in the human enterprise from 1750 to 2000 (28). The GreatAcceleration is clearly shown in every component of the human enterprise included in the figure. Either the component was not present before 1950 (e.g., foreign direct investment) or its rate of change increased sharply after 1950 (e.g., population).
The Anthropocene

- Humans as the dominant force for global change
- Reciprocal nature of human/nature interactions
  - We affect and we are affected
- Preparing citizens for a future in the Anthropocene
Questions or Comments?