

Weaving the Environment into the College Curriculum

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Maine Maritime Academy



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Acknowledgements

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TEACHING AND ASSESSMENT

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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”.*

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

UMaine General Education Field – Population and Environment

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

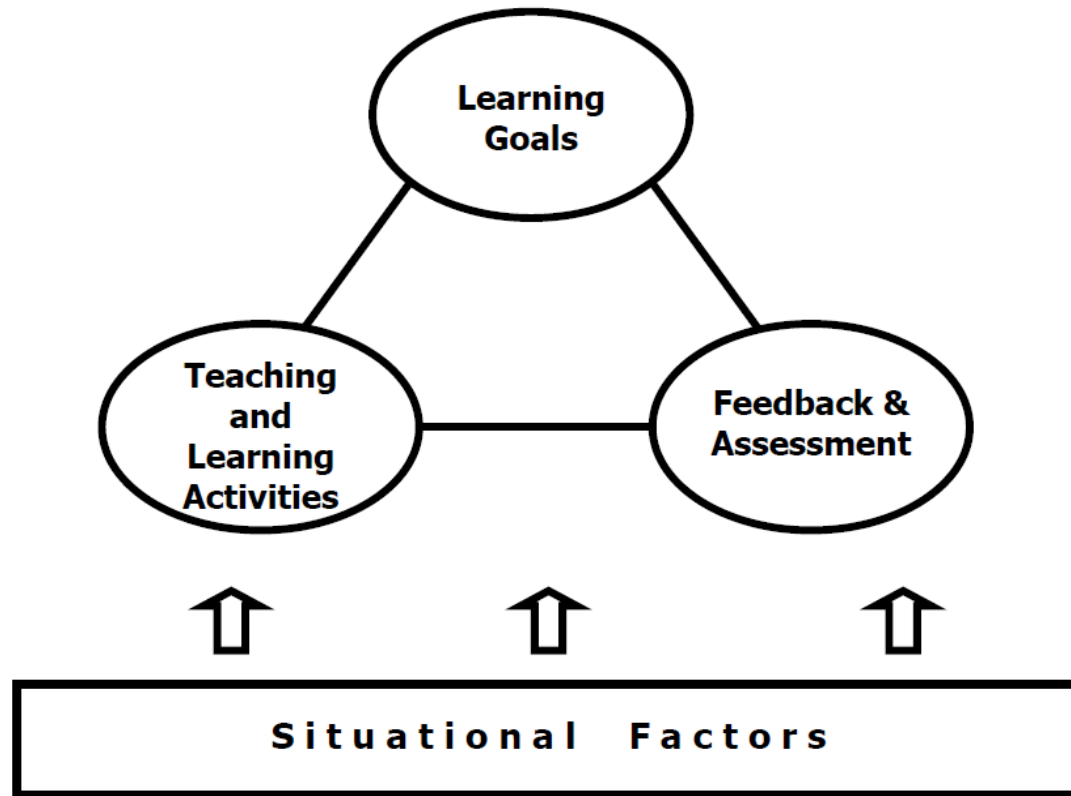
*Author of *Creating Significant Learning Experiences in College Classrooms**

San Francisco: Jossey-Bass, 2003



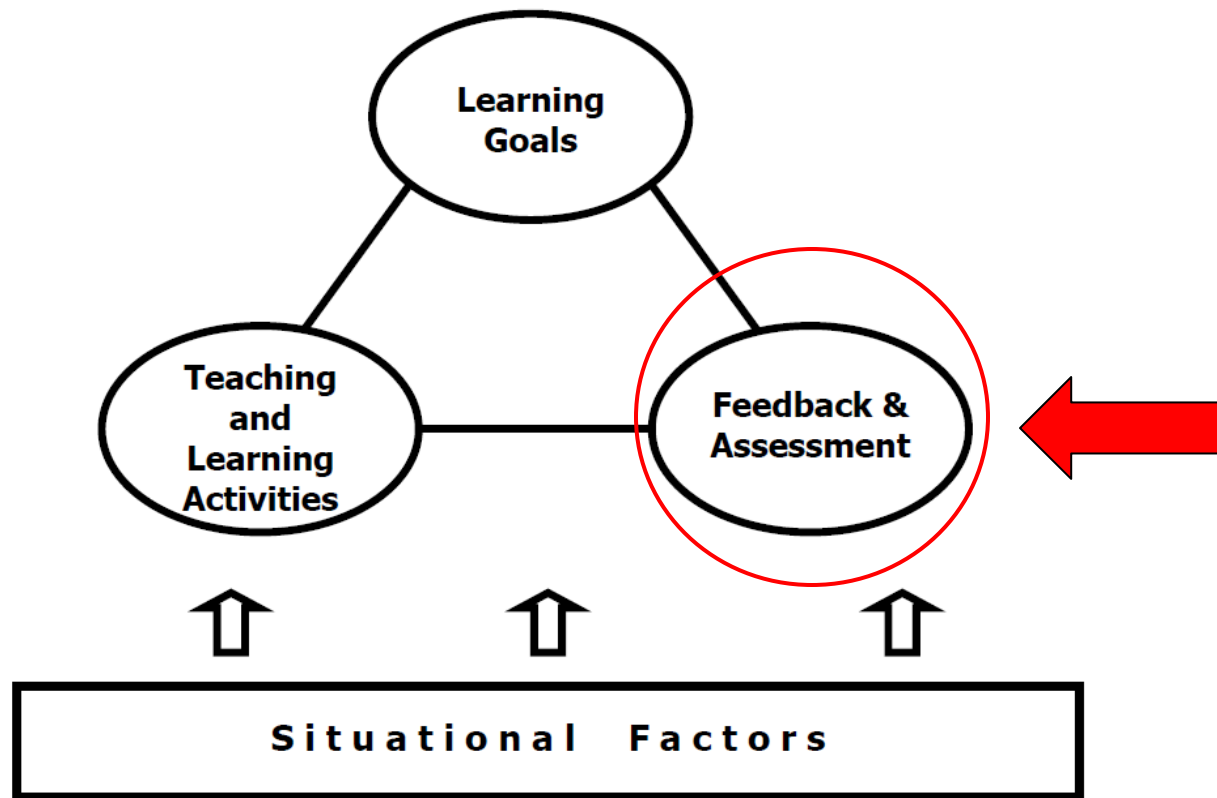
Design for Environmental Curriculum – Dee Fink Model

The Key Components Of INTEGRATED COURSE DESIGN



Course Design for Environmental Courses – Dee Fink Model

The Key Components Of INTEGRATED COURSE DESIGN



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)

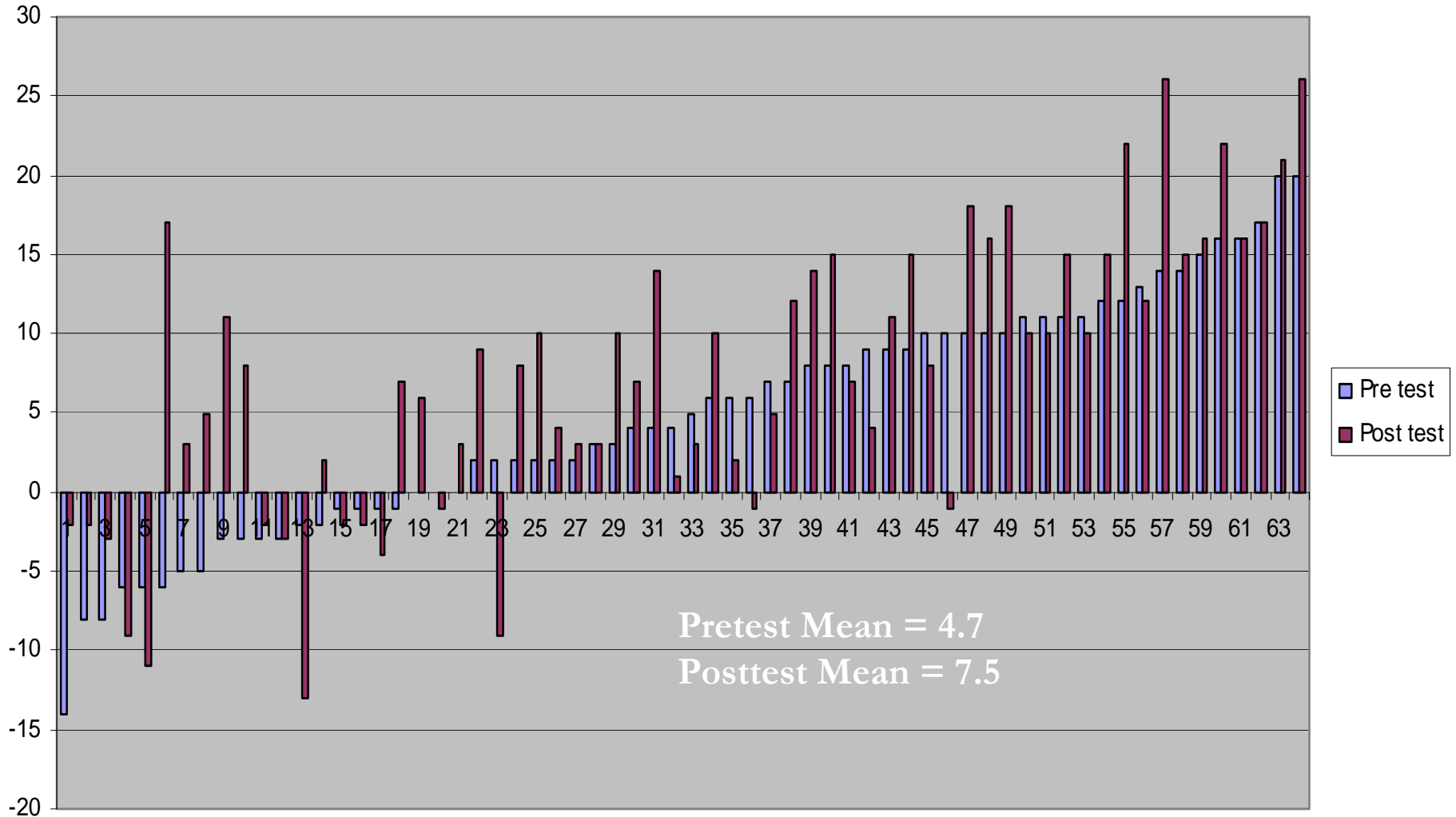
Item

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.

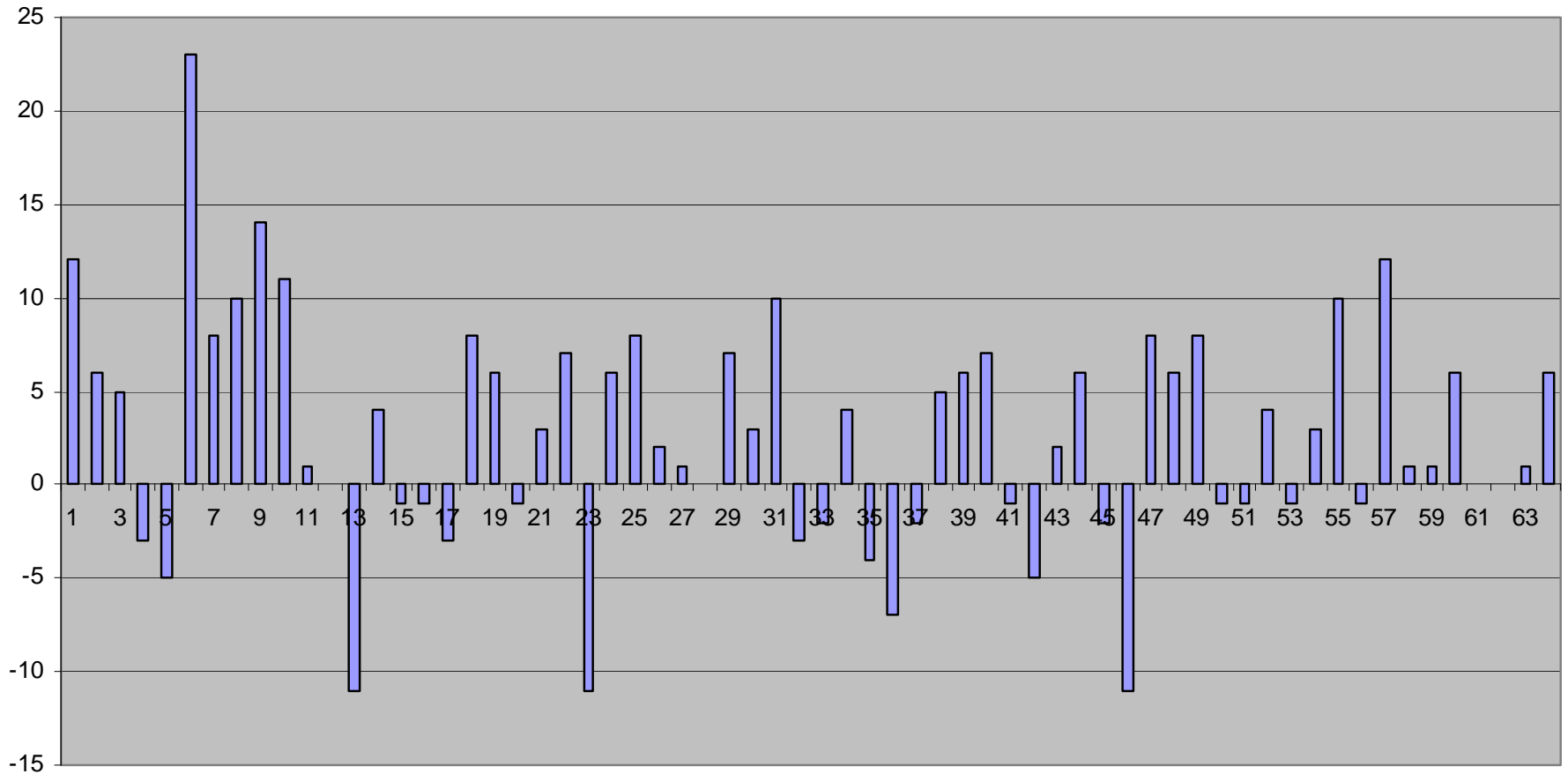
NEP

- 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



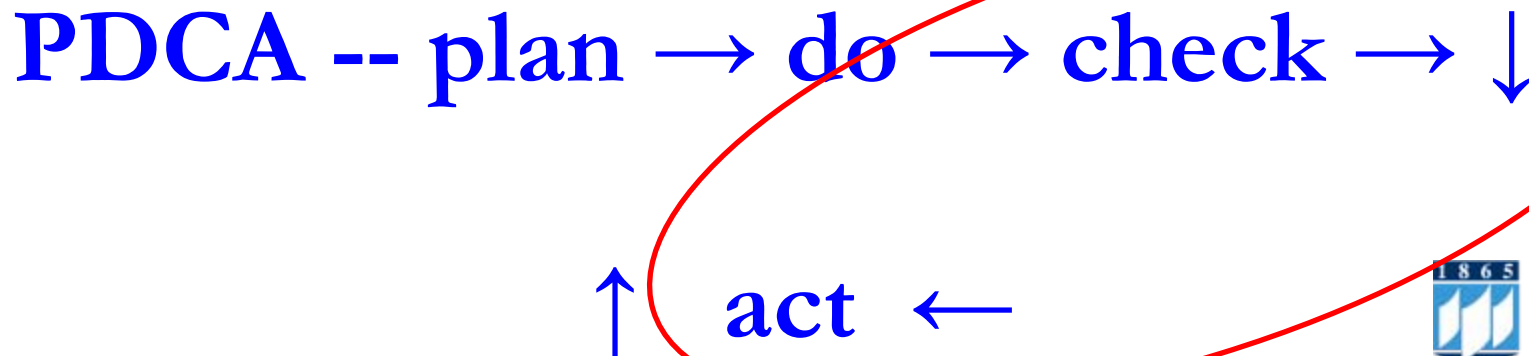
Change in Individual NEP Scores



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



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

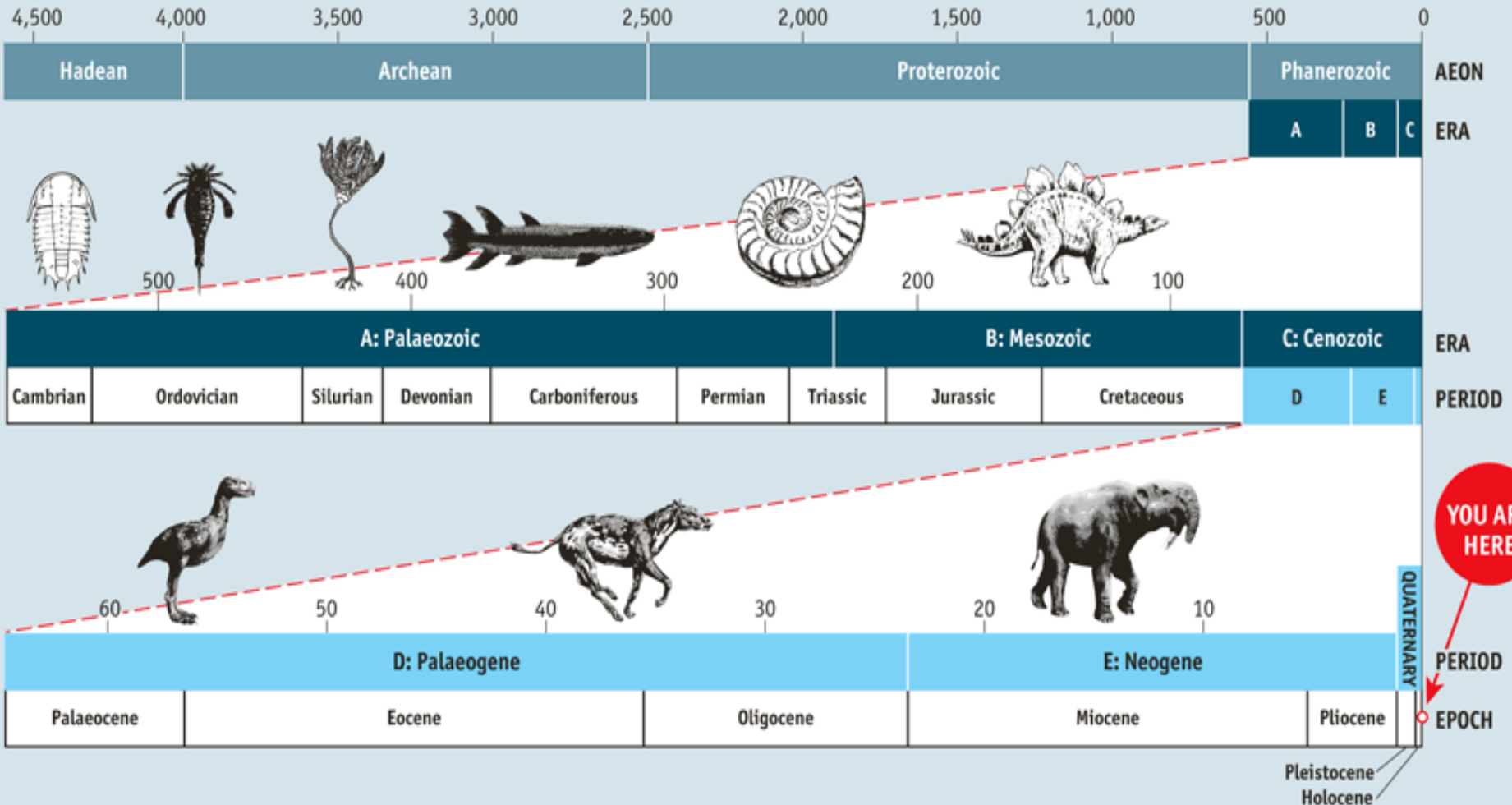
Article

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

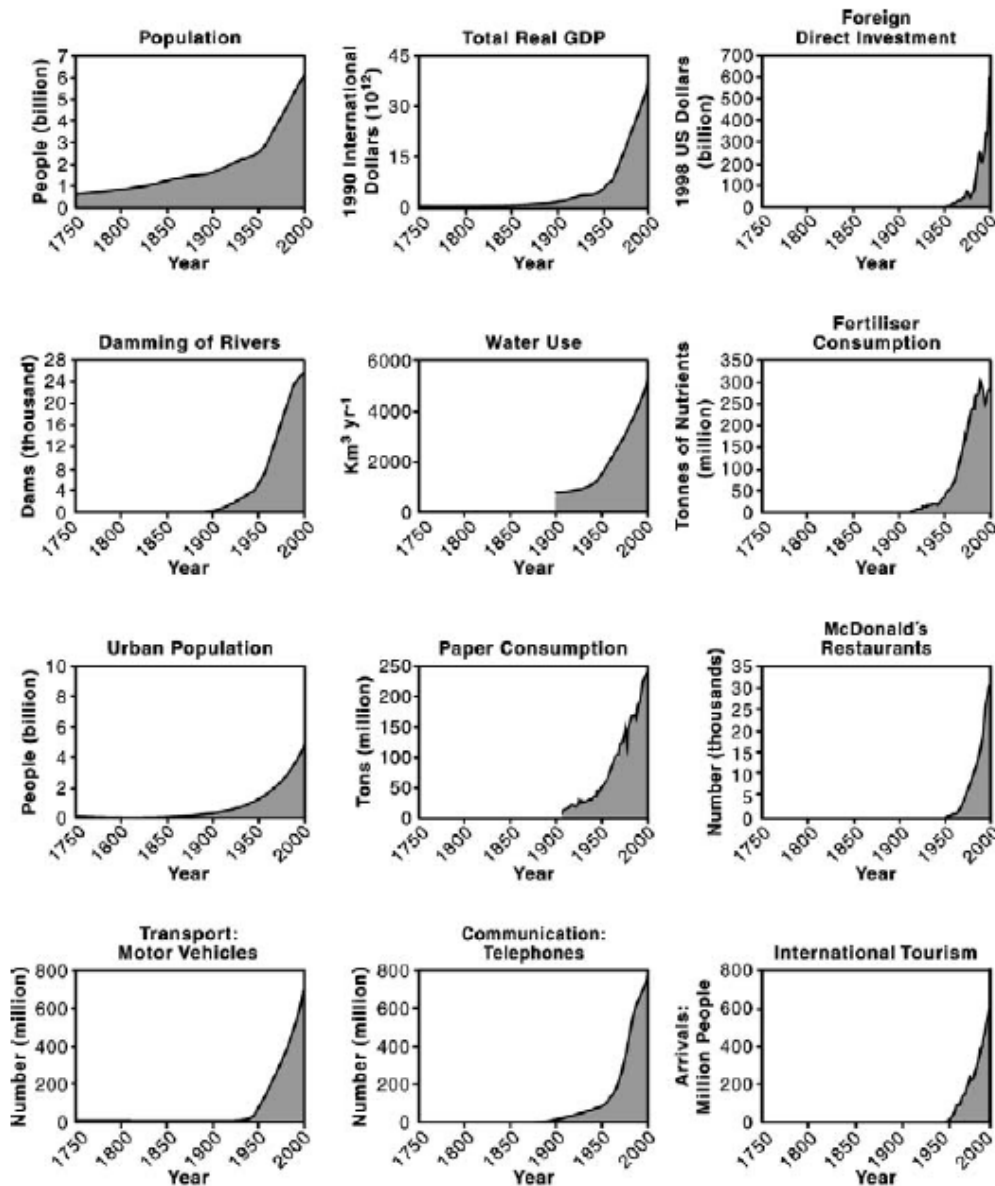
The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?

Ambio Vol. 36, No. 8, December 2007

MILLIONS OF YEARS AGO



Source: The Economist



The Great Acceleration

From Steffen et al., 2007
p. 617

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Figure 2. The change in the human enterprise from 1750 to 2000 (28). The Great Acceleration 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?

