STATISTICS FOR CLIMATE CHANGE, GLOBAL WARMING, AND BIODIVERSITY

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Why are we Developing Casebooks

A number of technological developments and new pedagogical approaches are forcing us to reconsider what we do with students

- R is becoming an industry standard due to its flexibility and cost
- Authentic Assessment asks students to demonstrate mastery of material in ways that go beyond mere repetition of formulas and techniques
- Instructors are being asked to reevaluate what they are trying to accomplish with students in light of new web-based didactic systems such as ALEKS, OLI and MOOCS
- Publishers are moving in the direction of a single keystone text supplemented by casebooks
Casebooks include:

Student reading material that introduces a topic including some of its controversial aspects

Exercises that improve student writing and critical thinking skills

Materials related to applications of statistical techniques learned in class
Structure of a Casebook

A Casebook Contains
- Readings that introduce a topic
- Materials that develop a statistical concept using R and/or Excel
- A guided student example using a statistical concept
- Readings that introduce the controversies related to the topic

Writing exercises are interspersed throughout the material
Introduction to Biodiversity
   Essay “Biological Diversity: The Oldest Human Heritage,” E. O. Wilson
   TED discussion on Biodiversity by E. O. Wilson
   http://www.ted.com/talks/e_o_wilson_on_saving_life_on_earth.html

How is Biodiversity Measured?
   Selected readings from “Ecological Diversity and its Measurement,” Anne Magurran
   Video on Measures of Biodiversity

Calculating Shannon’s Index
   Using Excel
   Using BiodiversityR

Student Exercise
   Campus Biodiversity

The Value of Biodiversity
   Essay “Commodity, Amenity, and Morality: The Limits of Quantification in Valuing Biodiversity,” Bryan Norton
   Essay “Are There Alternatives to Destruction?”, Michael Robinson
Writing based on essay

“Commodity, Amenity, and Morality: The Limits of Quantification in Valuing Biodiversity,” Bryan Norton

The essay discusses the difficulty in putting an economic value on biodiversity and frames the issue of biodiversity loss as a moral dilemma.

Typical Question:
In the essay the author brings up the notion that assigning value to different species is not in fact “asking the right question.” What does the author mean by this and do you agree with his point of view?
Biodiversity Student Exercise

Typing Individuals on Campus

- Using Excel to compute Shannon’s Index
- Using BiodiversityR to investigate location diversity
Biodiversity Links

BiodiversityR
http://cran.rproject.org/web/packages/BiodiversityR/index.html

Tree Diversity Analysis
http://www.worldagroforestry.org/resources/databases/tree-diversity-analysis

Global Biodiversity Information Facility
http://data.gbif.org/datasets/

National Biodiversity Network
http://data.nbn.org.uk

Dune Dataset
this is installed when installing BiodiversityR
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