Integrating Spatial Educational Experiences (Isee) into Crop, Soil, and Environmental Science Curricula

Agronomy Department

C. C. Miller, M. Stowell Bracke
Purdue University Libraries

R. J. Glotzbach, L. Kocur, B. Benes
Department of Computer Graphics Technology
Purdue University, West Lafayette, IN

T. Neely, M. Wiggington, R. Nielson, and others
Natural Resources Conservation Service, Indianapolis, IN
Background

- Many concepts in our soil, crop, and environmental sciences courses are intrinsically spatial
  - soils vary spatially across landscapes
  - crops, cropping systems change with soils
  - environmental issues impact watersheds
Background

• Our students need geospatial skills
  – need to think spatially
  – understand the spatial aspects of problems encountered

• Currently using mobile GIS to teach soil science in the field
Integrating Spatial Educational Experiences (Isee) into Crop, Soil, and Environmental Science Curricula

• USDA – Higher Education Challenge Grant

• Goals - develop our students’ ability:
  – to use geospatial information to understand how and why soils and landscapes vary spatially at various scales
  – to understand how the spatial distribution of soils and landscapes impacts the distributions of crops, cropping systems, land use, and environmental and natural resource issues across Indiana
Integrating Spatial Educational Experiences (Isee) into Crop, Soil, and Environmental Science Curricula

• Tasks

  – Develop the Integrating Spatial Educational Experiences (Isee) Web Application

  – Integrate Spatial Educational Experiences into our Curricula
Primary Data Sets for Indiana

• Indiana 2005 Digital Elevation Model
  – Indiana Spatial Data Portal
  – 1.5 x 1.5 m, resampled to 5 x 5 m
  – hillshade & elevation map

• SSURGO Soils Dataset
  – NRCS Soil Data Mart
  – detailed, 2nd order soil survey
  – soil parent material, loess thickness, drainage class

• Other maps
  – roads, towns, aerial photography, etc.
Soil Maps

- Dominant Soil Parent Material
  - based on soil series description
  - generally deepest material, or most unique material in profile
- Loess Depth
  - thickness of wind-blown silt
- Soil Drainage Class
  - presence of a seasonal high water table
- Additional thematic maps
Software

- Google Earth API
  - Application Programming Interface
  - Web browser plugin
  - Fast, easy to navigate
  - Use Google imagery, roads, political boundaries, etc.
  - Use our own soils and interpretative layers
http://isee.purdue.edu
Assessing Impact of Isee on Student Learning

• Two sections of Introductory Soils (n=51)
• Most have majors within School of Agriculture
• Mainly Freshmen and Sophomores
• Average age: 20 years old
• Gender: 57% Male; 43% Female
• Residents of Indiana: 86%
• 16% of participants have participated in high school soil judging (average 2-3 years in Indiana)
Concept Maps

1. Training Session for Constructing Concept Maps
2. Construct Pre-Concept Map
3. Implement Isee Activity
4. Construct Post-Concept Map
Before Isee exercise
After Isee exercise

20 of the 51 students (39%) added new connections or information to their post-concept maps
Thank You!

*Some items are currently under development and will be available in the future.*