EarthEd Online Software Development

Prof. William Prothero

Key UCSB Participants

- Prof. Greg Kelly (Education)
- Dr. Dottie Pak (Geology)
- Nuno Sena (Education grad student)
- Rick Hou (Computer Science grad student)
- New Media Studio (local non-profit)
  - Marty Landsfeld
  - Art Clifford
  - Bruce Caron (CEO)

Our goal is to implement modern pedagogy in an online environment

- Content acquisition
- Science process
  - Investigation using data
  - Argumentation
  - Presentation
  - writing
- Social relevance

Support is required for:

- Activities and deadline management
- Delivery and grading of content assessments (online homeworks)
- Communications and group work
- Online writing and review
- Graphic editing and linking
- Earth data access and display
- Feedback to the student on her/his progress
- Feedback to the instructor on student progress

Activities and deadline management

- Deadline, with late penalties for each graded activity (teacher over-ride)
  - Late penalties are automatically applied
  - Late penalties are shown to each student
  - Support for teacher grade entry
  - On-demand grade calculation
- Course content is managed through links to web pages (the course web site)
- Syllabus and other content is delivered in a paper lab manual or on web pages

Delivery and grading of content assessments

- Auto-graded homeworks
- Thought questions graded by teacher (forum postings)

<u>Planned:</u>

- Peer ratings of forum postings (0-5 stars)
- Expanded capability for teacher grading of postings

Communications and group work

- Threaded forum discussions
- Live chat

Planned:

- Group projects
  - Online slide shows explain content and results of investigations
  - Posed thought questions answered by peers
  - Peer feedback on answers
  - Presentation threaded discussion

Science writing

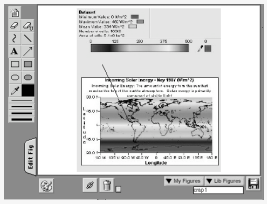
Student view:

- Guided science writing
- Image editing, uploading, and linking
- Scoring rubrik
- Online hand-in

Teacher view:

- Online commenting
- Online scoring
- Online return

Graphic editing and linking



- Images are captured and uploaded (Image Manager)
- New images creation
- Image annotating
- Image uploading
- Linking to text
  - Writing
  - Forum postings

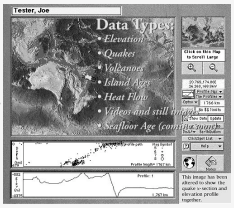
Planned:

- Links to URL's

Earth data access and display

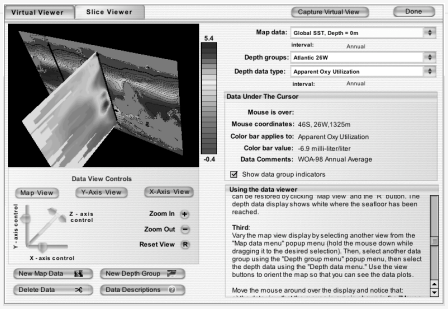
- Plate Tectonics Data (Our Dynamic Planet)
  Elevation, seafloor age, quakes, volcanoes, heat flow, linked images
- 3-D Ocean Climatology (WOA-98)
  - Temperature, salinity, oxygen, phosphate, nitrate, rainfall.
- Worldwatcher (not integrated)
  - Images are captured using screen capture and uploaded using the EarthEd Image Manager
- Internet browser available data
  - Mini-studies on the web
  - Images copied to clipboard, and uploaded using the EarthEd Image Manager

Our Dynamic Planet

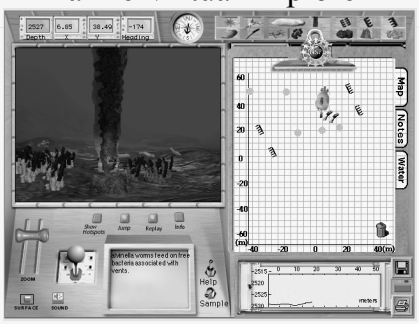


- Enough data to:
  - Identify the major tectonic plates
  - Determine plate boundary types
  - Determine spreading rates
    - Seafloor ages
    - Hot spots
- Detailed EPR data
- Images of data are captured and automatically uploaded

Global Ocean Data Viewer

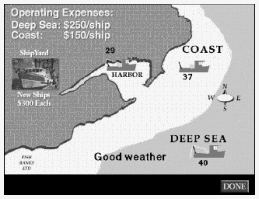


Marine Virtual Explorer



Fishbanks

- Reproduces conditions that led to the collapse of the New England Cod fishery
- Tragedy of the Commons
- Students find it fun



Planned:

- Online version

Moving EarthEd from Developer to Community Implementation

1. Develop for personal (mine) use
   1. Modification based on student feedback
   2. Interface issues addressed
   3. Debugging
2. Generalize for community use
   1. --> Gather community input
   2. Implement community recommendations
   3. Alpha test by small community team
   4. Debugging and feature additions
3. Community-wide dissemination

Dissemination Issues

- Distribution
  - Open source - free
  - API documentation and support
  - NMS
- Technical support
- Maintenance (bug fixes)
- Upgrades
  - Attract new developer/users

Expansion

- Shared resources
  - Homework problems
  - Assignments
  - Shared by all, built as used
  - Fits NSDL program
- Additional modules
  - Data exploration or other course modules add to EarthEd capabilities. The system is modular.
  - NSF GEO or CCLI funding possible