Design of an Online Global Learning Community: International Collaboration of Grades 7-9 Science Students

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Abstract:

This poster reviews the design decisions made in the construction of an online global learning community for grades 7-9 science students. The collaborative learning tools of class profiles, student-scientist forums / wrap-up research cruise, and peer review featured in the From Local to Extreme Environments curriculum are discussed. Initial evaluation of these tools and student reactions to global collaborations in this ongoing study has been accomplished through embedded online student surveys and argumentative discourse analysis of student writing.

Design Considerations:

- ☐ Student exposure to multiple scientific data sources
- ☐ Interaction with scientists
- ☐ Peer interactions
- ☐ Large participant number - scalability
- ☐ Multiple countries - different cultures, educational systems, first languages, etc.
- ☐ Different school calendars
- ☐ Protections for students

Context:

From Local to Extreme Environments (FLEXE) Energy Unit Curriculum - Spring 2009

Earth Systems Science Project developed in partnership with the Global Learning and Observations to Benefit the Environment program (GLOBE), a worldwide web-based science and environmental education program.

Global Learning Community Design Features:

- ☑ Clear collaborative educational goals:
  - ☑ Develop common understanding of energy in the Earth system
  - ☑ Develop understanding of the nature of science through experience
  - ☑ Become familiar with diverse environments
  - ☑ Compare environmental data from diverse environments
  - ☑ Interact with peers and scientists
  - ☑ Conduct online peer review
- ☑ Asynchronous communication
- ☑ 23 days of instruction over 4 months - flexibility
- ☑ Principle contrast: Domestic U.S. vs. U.S. to international class partnerships
- ☑ All communication in English
- ☑ Formats: text, images, videos
- ☑ Student anonymity

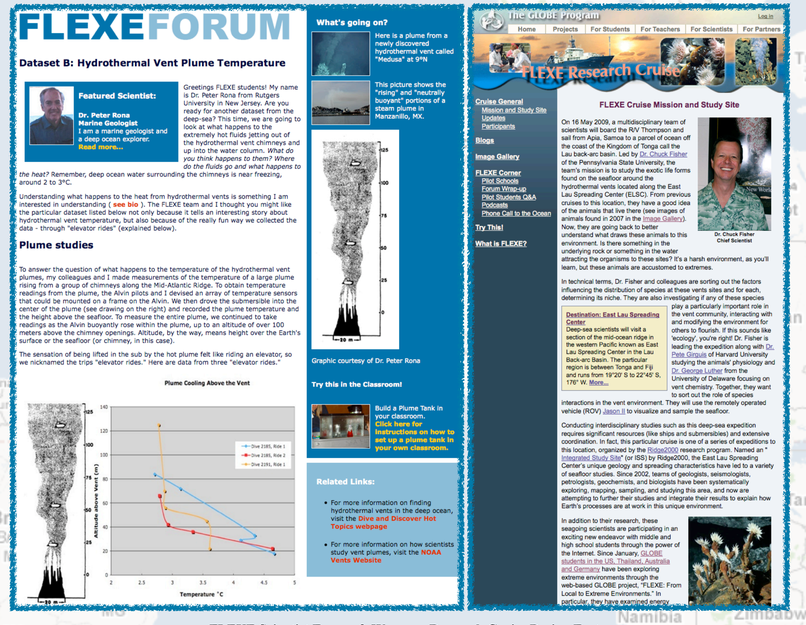
33 Teachers & Their Students in the U.S.A.

4 Teachers & Their Students in Germany

6 Teachers & Their Students in Thailand

7 Teachers & Their Students in Victoria, Australia

Student-Scientist Forums & Wrap-up Research Cruise



Online Student Peer Review

Class Profiles

School Data	
Name of School	Beckman High School
Latitude	42.4740
Longitude	-91.1144
Elevation (meters)	292
3 Warmest Months	June, July, August
3 Coldest Months	December, January, February
Highest Temperature Last Year (°C)	28
Lowest Temperature Last Year (°C)	-32
Average Daily Temperature Variation During Warmest Month (°C)	10
Average Daily Temperature Variation During Coldest Month (°C)	10

Class Data	
Class Introduction	Our eighth grade Earth Science class has 67 students who primarily speak English. A few students are enrolled in an Exploratory Spanish class. Our school is a private Catholic school located in the eastern Iowa rural farming community of Dyersville, Iowa, home of the Field of Dreams movie site. We are looking forward to working with your class.
Extreme Temperature Location in our Environment	On February 6, 2009 in the morning, the coldest temperature: 4 degrees Celsius which was north of the school on a hill where there was shade from a tree and very windy. The warmest temperature: 30 degrees Celsius which was under a vent which was above a door on the northeast side of the school.
Temperature Variation in our Local Environment Summary	On February 6, 2009 in the morning, the temperature variation in our local environment was from an low average of 7.7 degrees Celsius to an average of 22.5 degrees Celsius for a high.

Student Data

What were your hottest and coldest days like last year? What do you remember doing on each of those days? Did you have to stay indoors? (1 answer)

Describe typical outdoor activities you participate in during the summer and winter. If you don't have winter and summer, describe typical outdoor activities for your other seasons, like rainy and dry seasons. (1 answer)

students-389 — **"**Well, hunting. I hunt deer with my 12ga. 870 Remington. I go with some of my friends in my timber. Then I sit and let the deer come to me. Then i also snowmobiling in our timber too. I go with friends on that too.**"**

How do your pets act in the warmest and coldest months of the year? How do you take care of them in these months? Do you need to do anything different for them during the different seasons? (1 answer)

students-391 — **"**I don't think pets really act any different. Some stuff you have to do for them in the winter that is different then others is you have to put stuffing in their doghouse more to keep them warm. In the summer you need to give them more water so they stay hydrated.**"**

Describe the seasons in your environment (Winter, Spring, Summer, Fall, Rain vs. Dry Season). When does each season occur, how long does it last and what are one or two words to describe each season (e.g., summer is "hot" and "muggy", winter is "sunny" and "very cold")? (1 answer)

Describe where you are located in relation to large bodies of water, mountain ranges, and location on your continent. If there are no large bodies of water or mountains nearby, simply state this and describe other physical features in your environment. (1 answer)

students-395 — **"**We have one big river that is the Mississippi River. We also have other small rivers like Lake Delhi.**"**

Class Profile Design Features:

- ☑ Prompts to focus on environmental data & life in local environment
- ☑ Personal and local environment data
- ☑ Manageable scale of partnerships
- ☑ Class data
- ☑ Student paragraphs
- ☑ Updates throughout unit
- ☑ Teacher to teacher email

FLEXE Scientist Forum & Wrap-up Research Cruise Design Features:

- ☑ Scalability
- ☑ Inverted Ask-a-Scientist design
- ☑ 3 components spread over ~3 weeks for each Forum
  - ☑ Scientists provide deep-sea data and ask questions
  - ☑ Students submit responses to scientists' questions
  - ☑ Scientists write feedback mentioning sample student responses
- ☑ Additional resources & activities in sidebar
- ☑ Scientist and ship crew blogs
- ☑ Podcasts, images & research cruise / study site details
- ☑ Live phone call to the ship

Peer Review Design Features:

- ☑ Student anonymity
- ☑ Domestic U.S. and U.S. - international pools for peer review process
- ☑ Common knowledge base - FLEXE unit and Lettuce Seed Bioassay Experiment
- ☑ 5 components to peer review process spread over ~ 8 weeks
  - ☑ Conduct lettuce seed bioassay experiment
  - ☑ Write & submit initial scientific report
  - ☑ Review 2 student reports from pool
    Yes/No and open ended feedback
  - ☑ Receive peer reviews
- ☑ Revise and submit final report
- ☑ Help tools for each section of report

R/V Thompson

East Lau Spreading Center.
(Between Tonga and Fiji)

Preliminary Research & Evaluation Findings:

Contrast of U.S. Students in Domestic U.S and International Partnerships

Embedded Online Student Surveys:

- Students excited to learn about partner environment and life in that environment, higher level of excitement in international partnerships
- Students felt data provided by their partner class was useful
- Students felt that their partner collaborations were similar to scientists' collaborations
- Students would like to continue working with their partner class

Analysis of Student Writing:

- Students in international partnerships wrote a higher percentage of correct scientific claims
- Students in international partnerships used more evidence to support their scientific claims
- Students in international partnerships wrote a lower number of incorrect or not valid bits of evidence
- Students in international partnerships used argument components of contrast, causality, & experience more often to support their scientific claims

= *Class in Domestic U.S. Partnership*

= *Class in International Partnership*