
# Baiting the Hooks:

## *Scientist-Educator team development through concept mapping and online tools*

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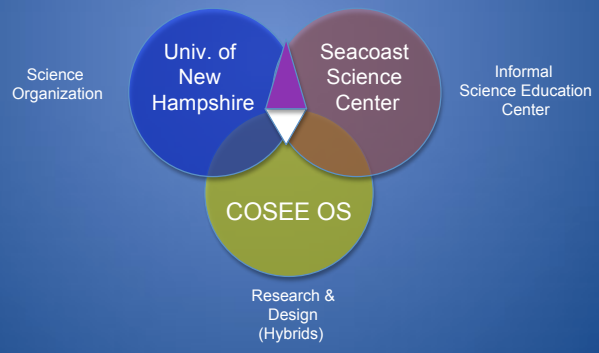
Give a man a fish and you feed him for a day.

Teach a man to fish and you feed him for a lifetime.

– *Chinese Proverb*




MUTUALISM

# Overview

- Since 2005, COSEE*-Ocean Systems has been creating & testing *models of collaboration*

## Goals include:

– **Engaging** ocean *researchers and educators* to better communicate complex science topics

– **Creating** new online learning resources

– **Using** *workshop results* to inform next steps

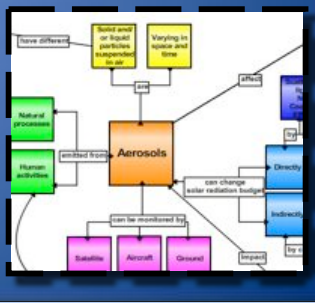
– **Testing** *transferability of models* for maximum impact


* COSEE = Centers for Ocean Science Education Excellence

# Engaging Researchers

- Workshop experience
  - Increase the capacity of scientists to effectively translate their research into compelling and relevant content for various audiences
  - Focus: Audiences at Informal Science Centers
- Methodology = Concept Mapping
  - Help deconstruct knowledge behind complex topics

(e.g., climate change) into core concepts to create "concept maps"



# Engaging Researchers

- Flow of Workshop (Day 1)
  - Learn the 'pedagogical tool' of concept mapping
  - Learn how research is aligned with * OL/CL principles
  - Choose focus question(s) and core concepts
  - Create personal research-based concept maps
  - Target an informal audience (8th grade level)
  - Refine maps through a series of iterations based on feedback from their peers and COSEE-OS staff.

Concept Map Topics:
- Aerosols and Climate Change
- Seasons in the Gulf of Maine
- Watersheds and Climate Change
- Ocean Acidification
- Indicators of Land-based Climate Change

* OL/CL = Ocean Literacy & Climate Literacy Essential Principles

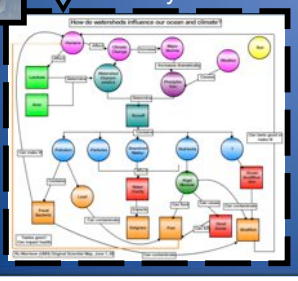
# Engaging Researchers & Educators

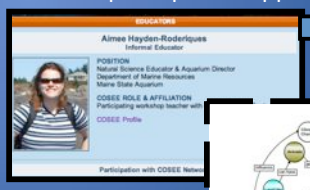
- Flow of Workshop (Day 2)
  - Scientists present their concept maps to educators
  - Educators give immediate feedback
  - Educators and scientists are "match-made" (3:1 ratio) into teams.
  - Teams refine research maps for a new audience (8th grade level…or other).
  - Teams present "consensus" maps to their peers for feedback from group.

# Engaging Educators

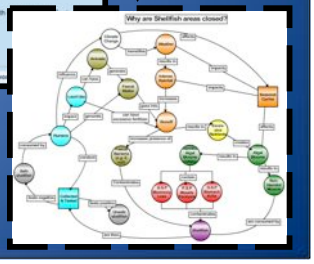
- Flow of Workshop (Day 3)
  - Customize maps for their home institution audiences
  - Add hyperlinked "assets" to the maps in the Concept Map Builder from the Ocean Climate Interactive database of resources
  - Share with other educators their concept maps and application ideas

Day 1





Day 3

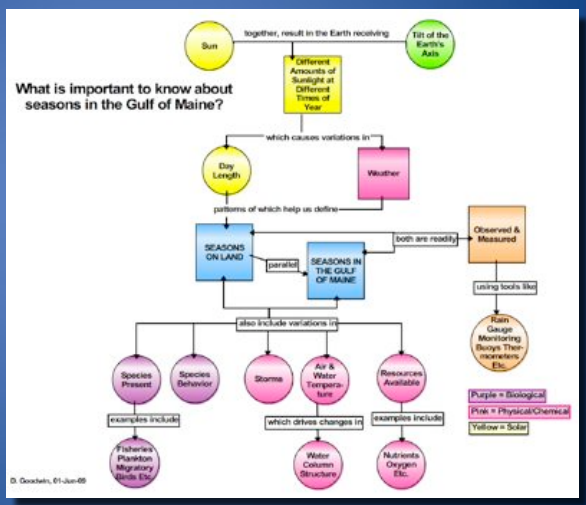


# Evolution of concept maps

Scientist original concept map:

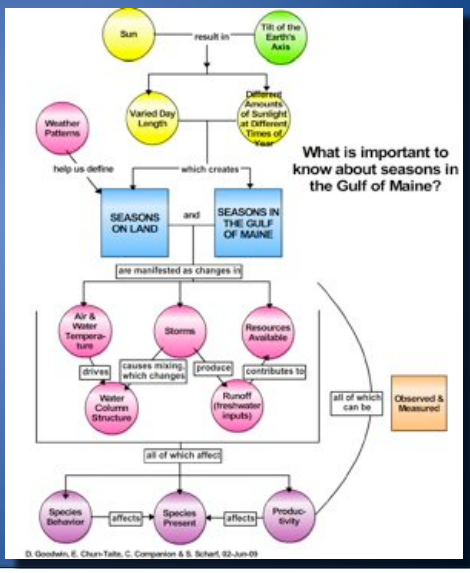
# Evolution of concept maps

Digital version of original map:




# Evolution of concept maps

Consensus map created with educators:



# Scientists' Insights…

- Direct Quotes from Video and Self-Reflection Forms:

*"Today was a good learning experience in teasing out concepts and connecting them."*

"It can be hard to take complex science content with which we are already very familiar and find what feels like correct, yet simpler, terminology."

"I enjoy the thinking procedure. It is easy to consider but really hard to translate some relatively advanced research concepts to what are understandable for 8-grade students."

"However difficult, this is a valuable exercise and benefits my understanding of my own science."

# Educators' Insights…

- Direct Quotes from Evaluations and Video:

*"It was GREAT to have a professional development session for informal educators - we do not get enough of this, as [we] tend to provide it."*

*"I loved the pacing of the workshop and also the amount of time spent with the scientists. The time spent with them was very very useful."*

"It went beyond, by helping me connect to other informal educators and start building my own network."

"The task of making the maps certainly gave an opportunity *to start a personal dialogue with the scientist*."

# Education Director's Insights…

**Did this workshop help the Seacoast Science Center?**

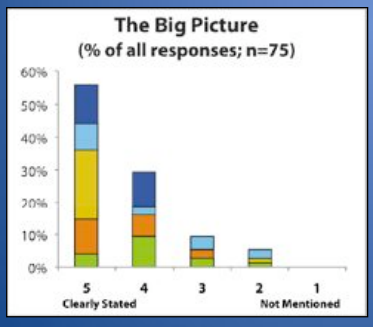
- Workshop has helped Seacoast Science Center make and sustain connections with scientists.
- Scientists are more aware of the needs of their informal audiences.

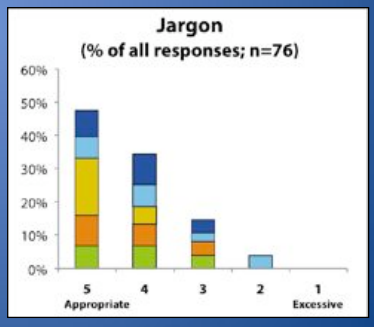
*"Anytime a scientist has to get outside their normal routine (e.g., reality check) and see how their work is perceived by others is a valuable lesson."*

Perrin Chick
(Seacoast Science Center Director of Education)

# Workshop Results

- During this workshops, participants rated scientists' <u>original</u> concept maps in terms of:
  - "The Big Picture" & use of "Jargon"

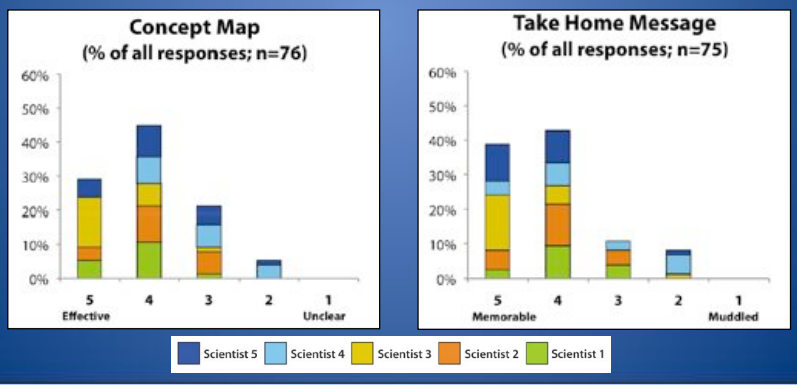



Scientist 5 Scientist 4 Scientist 3 Scientist 2 Scientist 1

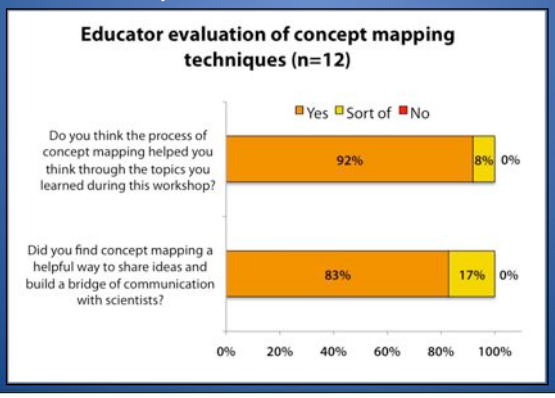
# Workshop Results

- During this workshops, participants rated scientists' original concept maps in terms of:
  - Concept Map & "Take Home Message"



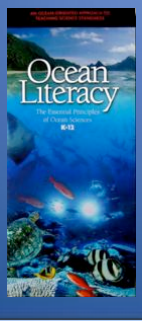

# Workshop Results

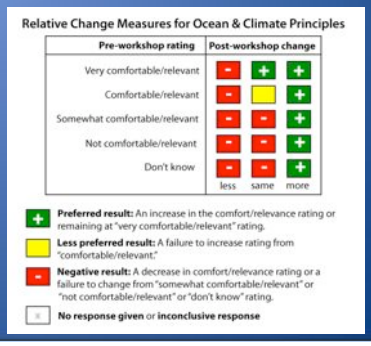
- Educators felt concept mapping helped them:
  - Think through topics learned at workshop
  - Share ideas / communicate with scientists



# Workshop Results

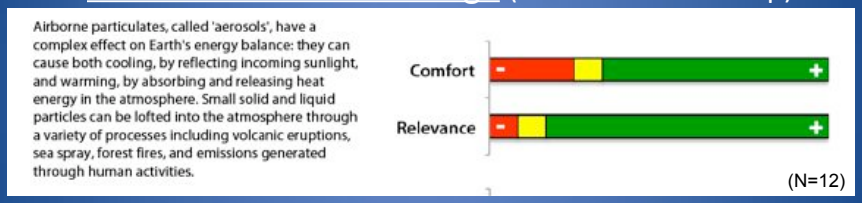
- COSEE-OS uses OL & CL principles to:
  - Measure educators' pre- and post-workshop "comfort with" & "relevance of" content
  - "Match-make" scientists & educators in teams

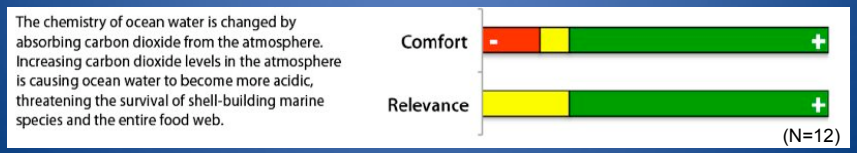




# Workshop Results

- "Literacy Change" data for OL & CL
  - Aerosols in Climate Change (featured in one map):




  - Ocean Acidification (featured in one map):



# Workshop Results

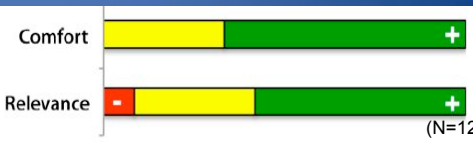
- Models and technology OL & CL principles
  - Models: Lower rating…

Observations, experiments, and theory are used to construct and refine computer models that represent the climate system and make predictions about its future. Results lead to better understanding of the links between the atmosphere-ocean system and climate conditions and inspire more experiments. Over time, this iterative process will result in more reliable projections of future climate conditions.


(N=12)

  - Scientific Observations: Higher rating…

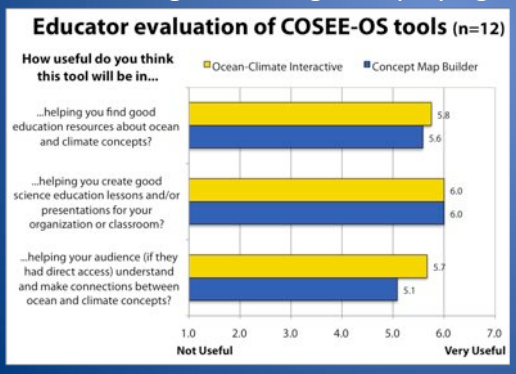
Scientific observations indicate that global climate has changed in the past, is changing now, and will change in the future. The magnitude and direction of this change is not the same at all locations on Earth.




(N=12)

# Workshop Results

- Workshop data drives software development
  - *Ocean-Climate Interactive* and *Concept Map Builder*
    - e.g., Selecting & displaying images, video, news, resources



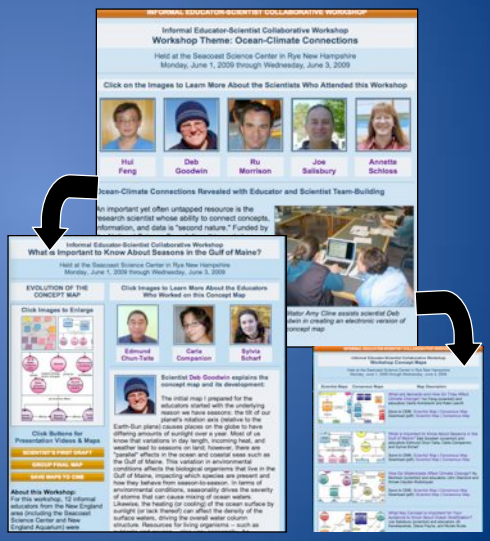


URL: cosee.umaine.edu/cfuser

# Workshop Documentation

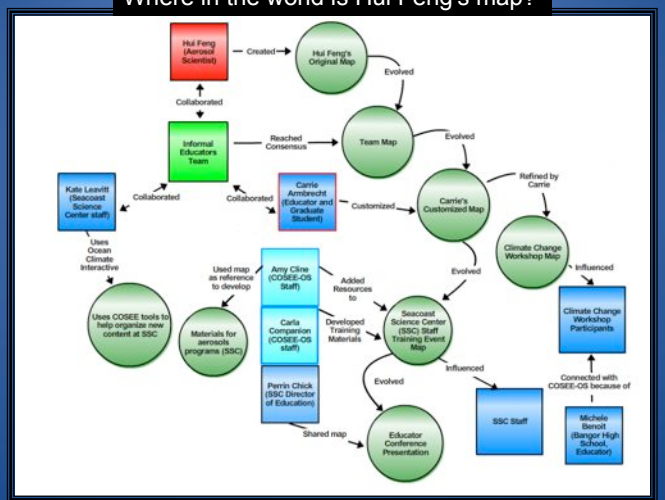
How can we share the 'workshop experience' with a larger audience?

- Scientist Pages
- Educator Pages
- Concept Map Pages
- Evaluation Pages
- Sharable concept maps (*)
- Photos & Video
- Quotes by participants




# Next Step: "Ripple Effect"?

Where in the world is Hui Feng's map?



# Next Step: Your Workshop?

Bait your science hooks!

- Could this workshop process help informal educators connect with scientists in your groups?
- Concept maps = sharable and publicly available
- Workshops = well documented & thus more transferrable


# Conclusions

- We look forward to:
  - Engaging more *ocean researchers*
  - Using *workshop results* to customize workshop experience even further for *informal educators*
  - Testing *transferability of models* for maximum impact

Contact for more information:
• Christy Herren (christy.herren@ gmail.com)
• Annette deCharon (annette.decharon@ maine.edu)

*THANK YOU!*

# Participants & URLS

*URLs: Check these out!*

- ***Ocean-Climate Interactive***
  - cosee.umaine.edu/cfuser
- ***Concept Map Builder***
  - cosee.umaine.edu/cfuser/cmb
- ***Scientist-Educator Collaborative Workshops***
  - *cosee.umaine.edu/coseeos/workshops/workshops.htm*

# Transferability of models

- New collaboration among four COSEE Centers
  - *"Cross-fertilization" of Faculty, Ph.D., and Master's students from USC, UCLA & the Cal State System*
    - COSEE-West by winter 2011
  - *"Broader Impacts" Development: Teaming Young Faculty & GK-12 Students*
    - COSEE-CA by summer 2011

# Selection of scientists' quotes

- "Hardest part is trying to fit this [topic] to a target audience and keeping it simple."
- "I thought specifically about simplifying the number of concepts included in the base map and the language used both in the boxes and linking phrases. I also intentionally used examples and key concepts that were sure to be tangible and familiar to members of the target audience."