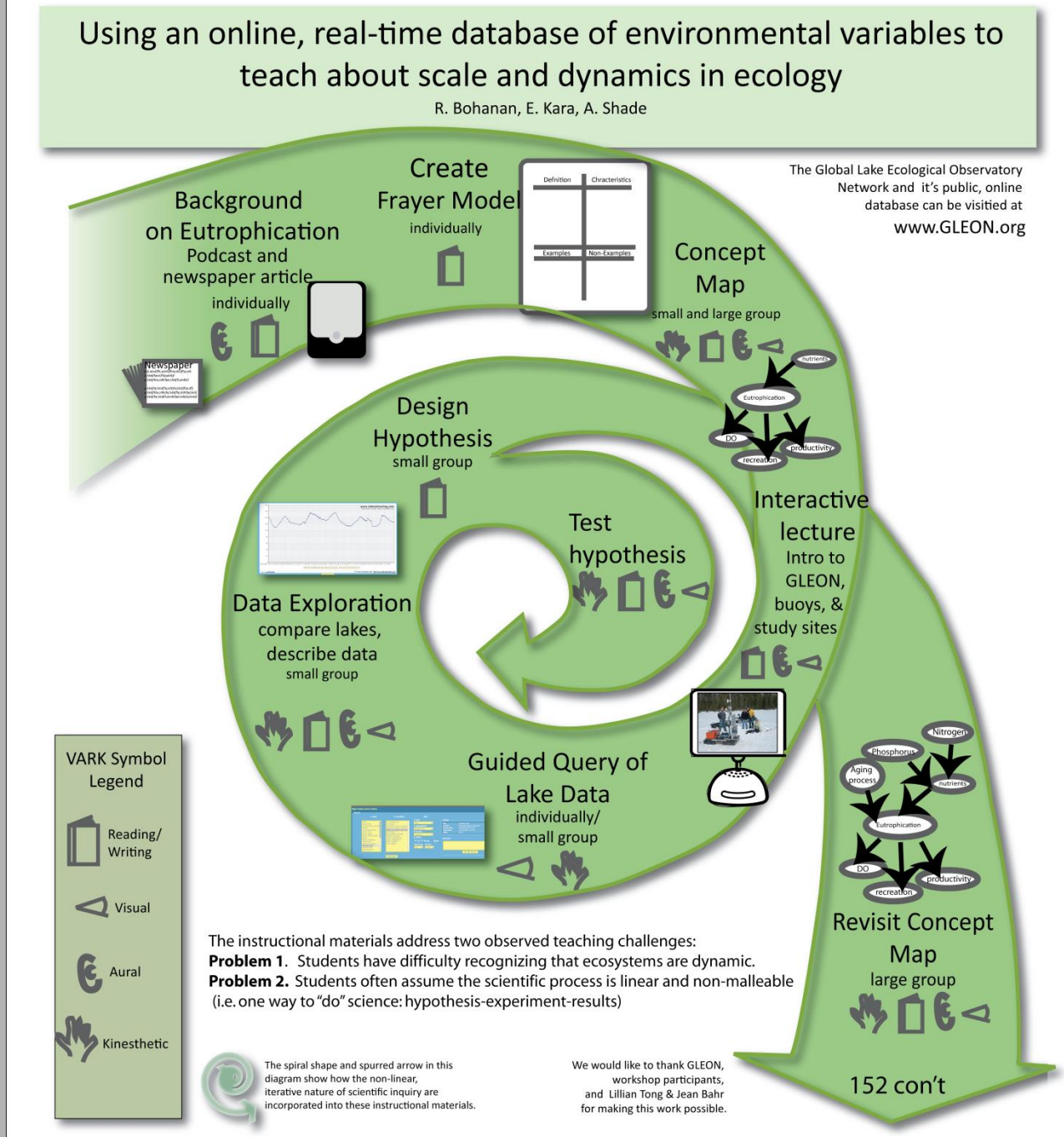
Engaging high school science teachers as **learners** and **collaborators** to develop instructional materials

Ashley Shade

Delta Internship

Spring 2009



Problem

- Effective collaborations between scientists and teachers are considered to be valuable for increasing scientific literacy, improving understanding of the nature of science (NOS) and improving elementary through high school science curricula.

- Kim (2007) found that science educators felt under-prepared to teach the process of science effectively, while scientists were generally unknowledgeable about education practices or pedagogy.

- Educators are often asked to engage as learners with instructional materials (IM) to teach them to how to approach the materials to benefit their students, or to gain a better understanding of a topic before presenting it in their own classrooms.

- There is less information available regarding teacher engagement as both **learners** of the content and **collaborators** with scientists during IM development.

Research Questions

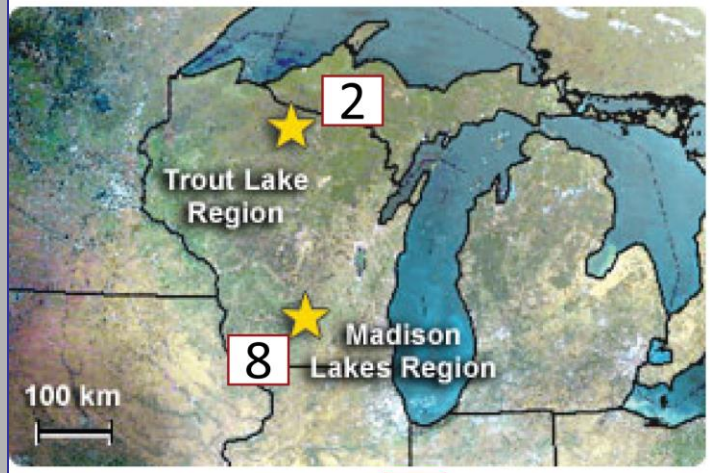
1. What are teacher attitudes about engagement as both a learner and a collaborator in the development of high school science IM?

2. How effective is the IM prototype at relaying content knowledge to the teachers (learners)?

3. What is the potential for classroom application of the IM prototype for the teachers (collaborators)?

Approach

We hosted two high school science educator workshops



www.limnology.wisc.edu # participants

Experienced high school educators

88% > 5 yrs teaching

Broad disciplines taught

landscape ecology to general chemistry

Motivated

attend a Saturday professional development

During these workshops, we asked the educators to:

- engage with an IM prototype as *learners*
- provide their constructive criticism as *collaborators*

Assessment

Questionnaire 1 (prior to wkshp)

Attitudes about

- –Engaging as a learner with IM
- –Development or adaptation of IM
- –Engaging as a collaborator with scientists

Collected artifacts

Background Knowledge Probe

Concept maps

Frayer models

What I know/Need to Know charts

Written reflection of how the IM contributed to learning

Questionnaire 2 (end of wkshp)

Attitudes about:

- Enjoyment of the workshop
- Mastery of learning outcomes
- Anticipated student mastery
- Accomplishment of the workshop goals
- Their perceived value as a collaborator

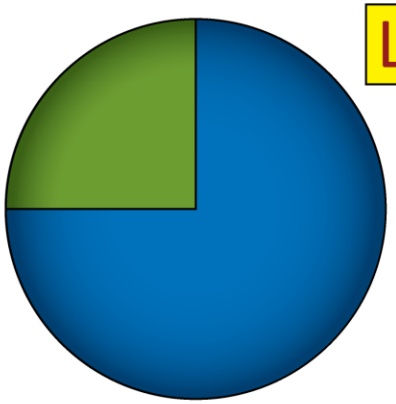
Anticipated use/modification of IM in their classroom

Mastery of of learning outcomes

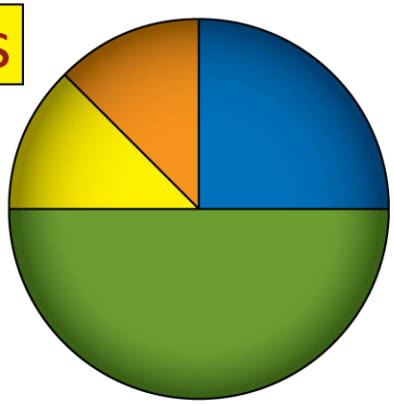
Overview of Results

Don't Know | Not Applicable | Strongly Disagree | Disagree | Neither Agree or Disagree | Agree | Strongly Agree

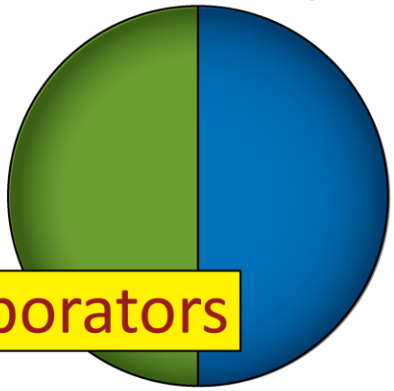
As a learner, the module was enjoyable to participate in.



A typical student in my class would enjoy this learning module



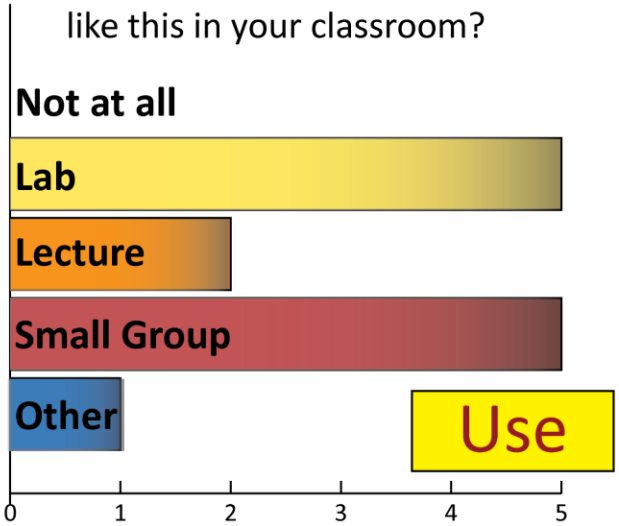
As a result of this workshop, I am likely to collaborate with outside groups to address teaching challenges



Learners

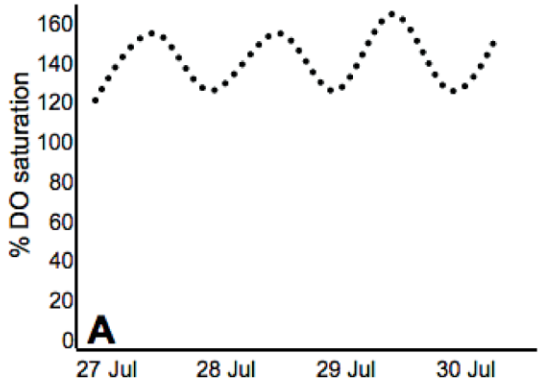
Collaborators

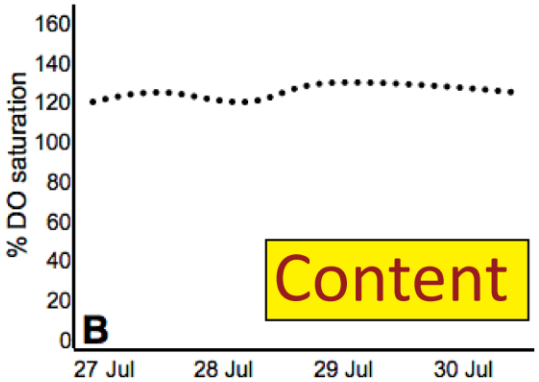
In what setting are you most likely to use a learning module like this in your classroom?



Use

Based on the graphs below, which lake is more productive?





Content

Big Take Home Messages

Experienced educators are less interested in using the IM prototype as a package. They would rather have a piece meal or tool box from which they can chose components for their own lessons.

Though educators self-report value on engaging as learners with IM, observational data suggests that they were less comfortable with this aspect of the workshop. Future work should attempt to reconcile this contradiction with rigorous assessment.

Educator suggestions for IM (collaborators)

Subscribe to Making Waves

Making Waves is a bi-weekly audio podcast reporting on the latest National Ocean Service news and information.

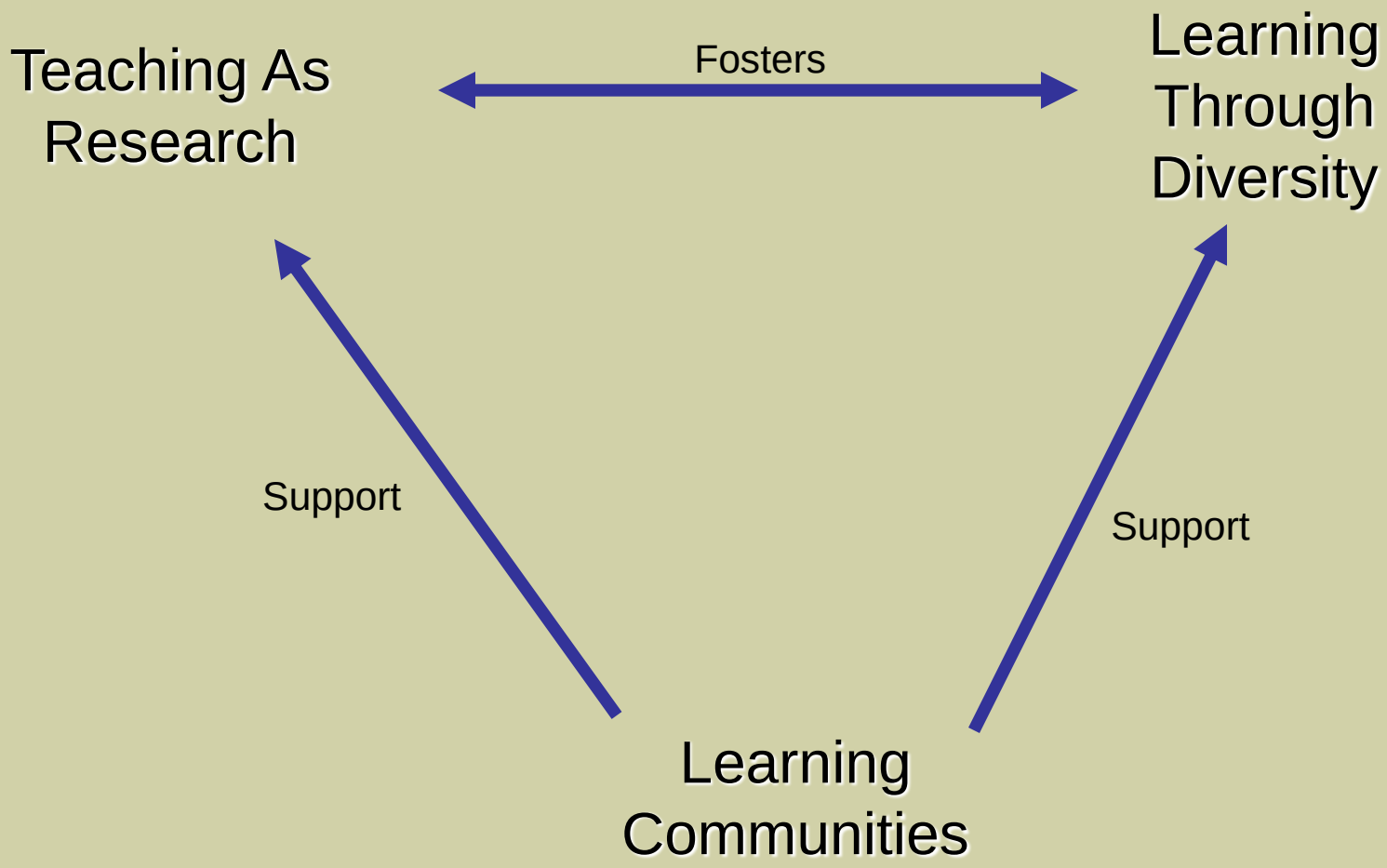
Relevant podcast in addition to newspaper background reading on eutrophication

Resources for purchasing sensors to provide a concrete experience

Video of young researchers in action: GLEON buoy deployment

Enhancing learning communities: Wiki site established for ongoing communication and repository of IM components

Journey


Teaching As Research
Fosters
Learning Through Diversity
Support
Support
Learning Communities

Looking forward

My internship has informed my view of teaching and learning as it relates to my future teaching. Most importantly, I have learned that I have much more to learn, reaffirming the philosophy of iterative teaching and learning. Particularly, I recognize there are things I miss or don't consider, mistakes I make, preconceptions I hold, and experiences that I lack that others have.

As a teacher, I am a learner.

I am continually learning how to teach.

I believe that this experience has made me more self-aware in my teaching, iterative in the teaching-learning process, and purposeful in seeking out dialogue and constructive criticism from other "teacher- learners".