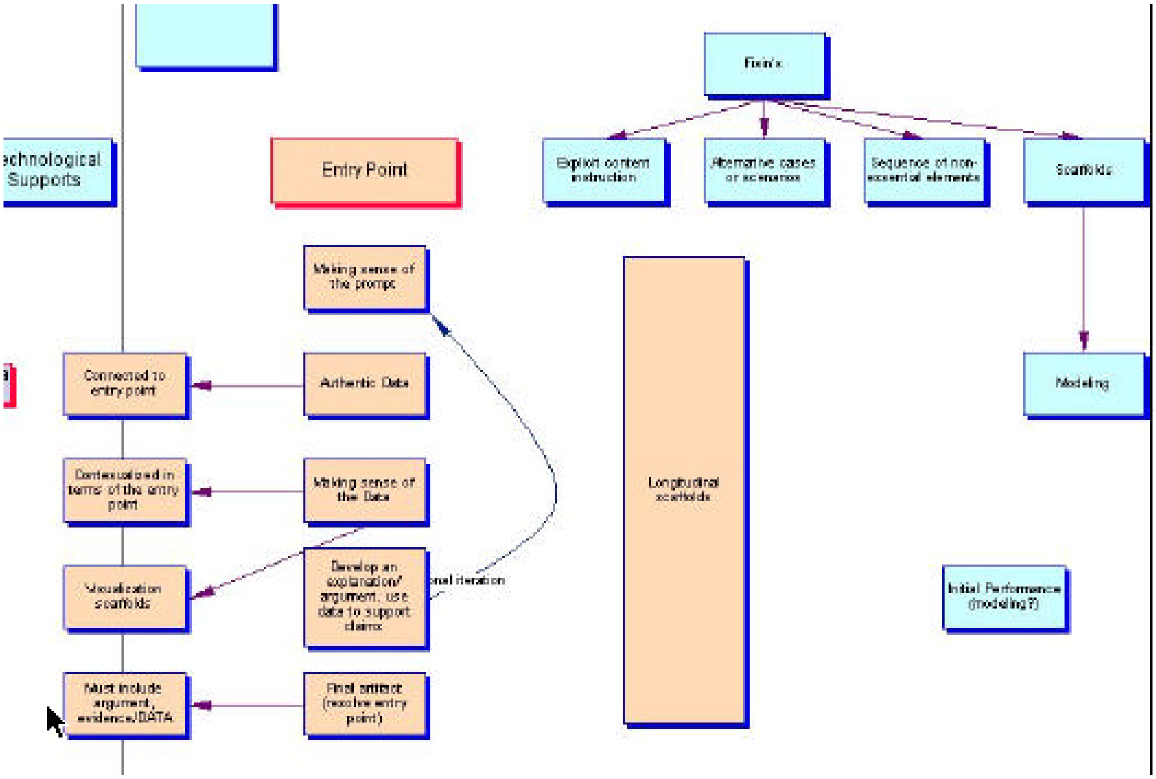

Oct 16 2001

Using the vanilla curriculum and the SCALE design protocal, an interview with one of our curriculum implementers was conducted. Here are the outcomes of the interview.

Teacher background

Grade level: College Juniors and a few seniors.
Class type (general science or specific domain)*:* CE 263: Environmental Engineering Fundamentals.
Years teaching*:* 3
Highest degree/science degrees*:* Ph.D.

Available resources

Available time for project: 2 class periods plus final presentation period (using standard university undergraduate semester classes).
Hardware, software, networking (be specific)*:* T1 networked computer lab available.
Probes, test kits, lab facilities
Proximity to water*:* 2 target ponds within walking distance
Field trips: possible? Who goes?*:* Yes. Instructor had wanted to conduct a tour of a local water treatment facility but time/scheduling did not permit it.
Is there a local issue to draw upon?*:* Yes, graduate dorms construction have polluted local wells.
Available experts?*:* Yes**.**

School organizational climate

Period length*:* 1:30 period***s***

Support for field trips

Pedagogical stance

Depth vs. breadth?*:* Course addresses fundamentals but Instructor wanted more depth with water quality specificlly.

Learner-directed vs. materials-directed?

Open vs. guided inquiry?

How do students learn?

Teach first, then apply?

Anchor instruction within complexity: Instructor was willing to consider anchoring instruction in the GEEWIS Scenario case #1.

Collaborative structure

Group size (on and off computers)*:* Instructor had not used groups to date, but felt groups would be best for GEEWIS problem**.**

Assess individual understanding vs. distributed intelligence

Group roles? Do roles switch?*:* Collaborative dyads or small groups will be established for the GEEWIS problem**.**

Learner characteristics

Interests, motivation level*:* Most students were characterized as engineers who minimized environmental issues in favor of construction priorities, and whose interest in chemistry was limited.

Primary language*:* English

Reading level*:* College

Prior knowledge

Science: students should already understand the principles of Mass Balance and they will have completed a Unit on water quality issues including concepts of eutrification, seasonal variability, the hydrological cycle, and geochemical cycle. Also they should be familiar with the impact of waste water on O2, hazardous waste, PCB's, acid rain, and arsenic in drinking water.

Inquiry

Current events

Tool and computer use

Their own watershed

Learning goals

For all goals, ask why is this important, why the teacher values it, how is it relevant to students' daily lives.

Standards we need to hit

Inquiry

Content: Eutrification in more detail, including getting to the underlying Chemistry, providing a realistic context for applying existing knowledge, and furthering student understanding of the dynamics of the water quality processes.

Affective

Motivation, engagement, etc.: There are hopes that engaging with an authentic problem can enhance student's appreciation for Environmental Engineering.

Assessment framework

Do you want to collect data over time to document changes in student learning?

To inform instruction, or for summative evaluation? Yes, some developmental profile would be of interest.

What constitutes evidence of student learning? Student give logical, quantitatively supported, convincing arguments for or against the lakes being a source of pollution. Student should:

1. Apply their knowledge of water quality issues wisely to the problem.
2. Extract principles (process models) from their prior knoweldge.
3. Generate links between what they already know and the demands of this particular problem.

Are there existing assessment mechanisms that need to be used (e.g. year-long journaling)

Protocol approaches

Part A (30 minutes)

Questions from above.

Part B (60 minutes)

Show vanilla model to teachers

Educative approach

Walk through elements of the model

Suggest fixings based on their responses

Figure out how to enact element

Figure out where new elements are needed

Interview Curricular Guidelines (outcome of the process)

The interview was completed in about 1 hr 30 min. It started with completion of the Instructor's biographical background information. Then brainstorming about several of the issues in the interview, including student goals for the lessons, classroom organization, assessments, and logistics. Here is an outline of the resulting lesson plan:

Pre-Activity:

Students were given an assignment to visit the 2 target ponds on campus and post a message using a threaded discussion forum (WebCT) that described their observations including their judgment of the health of the ponds.

Students were asked to suggest groups for themselves to work in.

Day 1

- View the Anchor problem as a class
- Brainstorming: Initial issues raised by the problem
- Exploration of the GEEWIS resources to provide additional context for the problem setting
- Initial group problem solving
- 2-minute "Task Report" from each group addressing:
  - What are the important issues?
  - What things are irrelvant or less important?
  - What is the critical consensus of the group concerning the key issues?
- View archived (or live, if working) data set
- Additional problem solving with groups
- (at end of class) 2-minute updated "Task Report"

[Homework] Re-visit and explore the information on the GEE-WIS Website.

Day 2

- Re-view Anchor problem as needed
- (from last class, Instructor(s) ensure major themes are present including PCB's, Nutrient loads, and Metals)
- Brief group work to compile thinking since last class
- Initial 2-minute updated "Task Report"
- Extended group work concerning quantification of findings (with expert support)
- (at end of class) 2-minute updated "Task Report"

[Interim, WebCT threaded discussion including experts as needed]

Final Class (4 weeks later)

- Presentation of group consensus and arguments concerning solution to the problem.