

Exploring Life Field Observation #3

Submitted by Al Bodzin

Teacher - Pat Berger

School: Souderton Area High School

Location: Souderton, PA

Dates: 4/5/01, 4/10/01, 4/11/01, 4/20/01

Number of observation days: 4

Classroom characteristics:

Number of students: 20

Level of students: Tenth grade *academic-regular level* biology

School socioeconomic level: Middle class suburban school district

Length of class period: 42 minute

Number of computers: 4 student PCs and 1 teacher PC in classroom (These were not used for Exploring Life). Nineteen PC computers with 13 inch monitors in library. No speakers or headphones were available.

Computer setting: Computers were located in a separate section of the library.

Computers were located against the wall. The computer area also contained three long tables with space for 12 students. These tables faced a white board.

(Note: The school had two other networked computer labs that could be used for Exploring Life).

Grouping: Students worked individually at each computer.

Class Content:

EL materials used

Exploring Life Chapter 7 and 8 text (color). The students used all Exploring Life Web materials for both chapters. Thirteen class days were spent on Chapter 7.

Observation Day 1 - Open computer time to review Chapter 7 to prepare for the chapter test.

Observation Day 2 - Completed the Chapter 8 WebQuests (ChocolateQuest) during first 25 minutes of the class. Second part of class was used for presenting information. (Note: the ChocolateQuest took students approximately 45 minutes to complete).

Observation Day 3 - Concept 8.1

Observation Day 4 - Completed Concept 8.1, Concept 8.2

Prerequisite materials

- The teacher always has her students outline the chapter text and answer textbook questions at the end of each section.
- The Fastplants lab took students 35 minutes to prepare.
- The teacher presented a lecture on the stages of respiration prior to student use of the Web materials.

Teacher adopted materials

- The teacher provided each student with a handout containing vocabulary words for each chapter. Students are instructed to provide a definition and examples of each vocabulary word.
- The ChocolateQuest worksheet was printed out, photocopied, and distributed to the students. Students recorded their answers on their worksheet and submitted these to the teacher.
- Students are assigned to outline the chapter and answer each *Concept Check* question in the book.
- During the teacher lecture, the teacher calls specific attention to page 3 of the text to describe the chloroplast.
- The teacher used four different types of seeds for the Fastplants lab. One group unintentionally used warm water instead of cold water in the procedure.
- Students are provided a blank diagram of a leaf and chloroplast to label as they go through Concept 8.1. Students were instructed to label the parts of the leaf and to differentiate areas of high, middle, and low sugar production on the leaf. Students were also instructed to label on the chloroplast diagram where the phases of photosynthesis occur. Students are instructed to write down answers to the embedded concept questions with feedback on the back of their handout.
- Students completed a hands-on chromatography laboratory on the day preceding Observation 4. Students used the Exploring Life 8.2 chromatography simulation to identify the pigments from their hands-on laboratory. Students compared their laboratory values with known values on the Exploring Life simulation.

Evaluator Description

Observation Day 1: While students worked with the Website materials, the evaluator rotated around the classroom and discussed Exploring Life with each group of students.

The following questions were asked:

- How is the navigation on the Website?
 - What do you like about Exploring Life?
 - What do you not like about Exploring Life?
 - Overall, what do you think of Exploring Life?
 - How could Exploring Life be improved to help you learn the biology concepts?
- Additional sub-questions were asked during student interviews as the students brought up diverse questions and comments.

Observation Days 2, 3, and 4: Participant observations. Students called on the evaluator to note their problems.

Summary of Findings:

Student attitude about learning

- Most students commented that Exploring Life was a better way of learning biology content than learning biology with a textbook and "what the teacher normally does".
- The learners noted that the Web-based graphics and animations helped them to understand the content.
- Three learners expressed negative reactions to the Exploring Life materials. They stated that they preferred "learning by lecture."
- Some learners had difficulty understanding the animation of Concept 7.4. Two students did not make the connection that "A" and "B" were related processes.
- Most learners had difficulty understanding the processes presented in the pinball animations.
- The WebQuest (CalorieQuest) and Explore! (Lance Armstrong) were well received by the students. Students found these activities meaningful to their daily lives. Some students noted that these examples related well to the Chapter 7 concepts.
- Three students noted that the Concept 7.5 diagram helped them to understand the "big picture" of the concepts presented in the chapter.
- The immediate feedback on the Website materials helps students to understand the main points of the concepts.
- The animations in the Fastplants lab helped students to understand what was occurring during the lab and also assisted them with the experimental procedure.
- One student commented that she had difficulty understanding the data chart in the Fastplants lab.
- Many students commented that they expected more interactivity with the pinball animation. They did not expect to sit passively and watch an animation.

- The students liked being able to run the chromatography simulation over and over again.

Teacher attitude

- The teacher has had fun with Exploring Life. Exploring Life has made it easier for her to teach the topics.
- Students move through the Web materials quicker than she expected. Since teaching this way is new, it has been challenging to gauge how fast the students will move through the activities.
- The teacher noted that her one IEP student is more "on-target" with Exploring Life. Exploring Life appears to be helping him to improve his learning.
- The teacher emphasized that there is a need to provide student activities with the Exploring Life materials. These would include additional labs and activities that can be assigned to students as class work or homework (i.e. - puzzles, problem-solving activities). Compared to her current textbook (Holt-Reinhart turtle book), "Exploring Life does not offer enough of a variety of activities to pick and choose from."
- The teacher experiences anxiety about being dependent on the computers. She commented that she "would be in a bind" if the network went down and could not access the World Wide Web.
- The teacher did not view the Real Video clip in the ChocolateQuest favorably. She stated that the video clip did not explain the chocolate factory as well as other video clips she has seen previously.
- The teacher noted that the ChocolateQuest was a good precursor to the photosynthesis chapter content.
- The teacher expressed a favorable attitude in relation to using the Fastplants lab with her students.

- The teacher stated that Section 8.1 does a great job presenting the breakdown of photosynthesis. She commented that “this was the best section on Exploring Life.”
- The teacher feels the students do not need her when the computers are used for reinforcement purposes.

Navigation

- All students commented that the navigation was good. They found it easy to move around and find things on the Website.
- More than half of the observed students did not enlarge their second browser window when using the Webquest.
- Students access into the Exploring Life materials is fast. Students log on to their computers and are able to enter a specific Concept in less than a minute.

Evaluator Recommendations:

1. **Chapter 7: Decrease** the speed of the pinball animations. The students felt they move too fast.
2. **Concept 7.1, page 3 animation:** The immediate feedback statement needs to be changed. Currently, the feedback message states "No, remember what happens when a marshmallow burns." This statement confuses students since they do not burn a marshmallow until they enter Concept 7.2.
3. **Concept 7.5, Respiration pinball:** Provide students a graphic with text that explains the concept prior to showing the pinball animation.
4. **ChocolateQuest:** Note to learners and teachers questions that require the use of audio sound from the Real Video clip. Learners could not answer a specific response without hearing audio. Students in the observed class did not have the capability to listen to audio.
5. **Fastplants lab:** The Exploring Life materials should inform teachers how to prepare a 15% KOH solution. The Teacher Resources section could contain an area on preparing solutions. This would benefit novice teachers.
6. **ChocolateQuest 2c:** This needs to be rephrased into a question. Currently it states: "We know that cacao beans are made up of fats, carbohydrates and proteins."
7. **ChocolateQuest 4b - Use of audio:** Provide learners alternatives to using audio to learn concepts and to answer questions in the Web materials. Learners were unable to locate the importance of "roasting" on the Website. The answer to this item relied on the ability of students to hear audio from the videoclip.
8. **Highlight visualizations in the Teacher Resources section:** Provide teachers a resource that points to Web-based visualizations that can be used in a classroom presentation to explain structures and processes. The observed teacher used examples in the text materials rather than on the Website.
9. **Concept 8.2:** Chlorophyll a and Xanthophyll 1 have the same Rf values. The number 3 band response in the simulation is chlorophyll a. How is a learner supposed to distinguish the difference between the two pigments?

Discussion

The teacher is very dependent on her computer support person. It should be noted that her school has good support in place. The teacher 's network has many restrictions. She is restricted from downloading applications and plug-ins for her own computer. A computer support person had to download the Flash Player for her own classroom computer.

The teacher noted that she has two students in another class that are colorblind. She wondered how this would affect their learning.

It is difficult for the teacher to schedule her entire class to use the computers in her media center. Currently, it would be impossible for her classes to use the computer lab for the entire school year. The teacher stated that she would be unable to use Exploring Life in her current classroom with only three computers.

Souderton Area High School has a school policy that prohibits students from using audio speakers in their computer lab. The computer lab used to have headphones for students to use. However, these disappeared a few years ago and were never replaced. This raises an important issue for the developers of Exploring Life. The developers should note that many learners would not have access to audio capabilities in their classroom settings. Alternatives to using audio to learn concepts and to answer questions in the Web materials should be provided.

The teacher and other observed teachers use many worksheets during their instruction. The worksheets are used to make sure the learners understand the concepts and read through the text and Web materials. The developers should consider creating a series of worksheets to help students identify main concepts presented on the Web for each chapter. A list of items and diagrams could be provided online that could be used by the teacher to create customized chapter worksheets to meet their particular need.

Students work at their own pace on the computers. The teacher's role in the computer lab is a facilitator, to move from computer to computer to answer questions that the learners have.

The Web-based visuals and audio help students with reading problems to learn the materials.

The Souderton School District has a strong technology push for their teachers to exhibit mastery of technology competency skills. Teachers are provided with training on inservice days or may select to self-teach these skills. The Souderton Area High School principal is very supportive of teachers incorporating instructional technology in the curriculum.

Final observations

Teacher attitude

- Overall, the teacher has a positive attitude toward using Exploring Life with her students. She prefers to use the Web-based materials instead of using videos and laserdiscs to help students understand the concepts.

Student use of Computers

- Students have a tendency to skim through materials on the computer and many do not read the text carefully. The students tend to resist reading the material on the Web.
- In the Concept 8.2 simulation, some learners did not use the formula to calculate the R_f values. They played a "guessing game" with the simulation to find the correct answer that identified the pigment.

Teacher adoption of materials

- The teacher has a strong belief that "students need something tangible" to help them as they go through the materials. Handouts are used extensively to help students organize their thinking and to make sure that they understand the concepts that are presented in the material.

Examples of student comments

Positive comments:

- "It's a lot better than reading the textbook. I learn better with the Web."
- "You go at your own pace. You don't have to wait for anybody."
- "I don't like to read from the textbook. I prefer to be on the computer."
- "I like the idea of not being in the classroom all the time and using the computer."
- "You can interact with things. You get to explore and see how things work."
- "The animations helped me understand the laboratory procedure."

Negative comments:

- “The pinballs were difficult to understand.”
- “The pinball goes too fast. It needs to slow down. It should be more interactive.”