The Environmental SuperSleuth

A conceptual captology design by Cathy SooHoo
The Environmental SuperSleuth

Persuasive Purpose
To educate middle school students about authentic, local environmental problems, and to get them actively involved in protecting the environment.

Industrial Design
Navigation buttons allow the learner to gather evidence through interviews and data collection, and record and organize thoughts and data in “My Notebook”.

Experience level of the user and difficulty of the case are indicated.

Help button gives context sensitive help for the interface and clues or hints for the next steps a learner might take.

Visual and audio accounts describe the current environmental mystery case.

Case #1 Mystery of the Dying Salmon
Location: Seattle, WA

The Mystery:
The number of salmon in Avery Creek has been decreasing drastically since 1995. Why are the salmon dying? What can be done to save the salmon?

Where to Start:
Start your investigation by interviewing local people, or experts, finding data, and writing evidence in your notebook. If you need help, click the Help button.
User Description

- Middle school students (6th - 8th grade)
- Interested in learning about the environment
- Has access to a computer at home or school
- Has some experience making scientific hypotheses and using evidence
- Has some experience taking notes for research (e.g. for a school report)
- Knows general concepts of graphs and maps
User Profile: Sarah

- 7th Grader
- Lives in Seattle, WA
- Attends a local public school
- Has a computer at home, but likes to use the computer in her classroom after-school with her friends
- Has written a number of school reports since 4th grade
- Likes science, and wants to be a pediatrician when she grows up
Sarah Solves the Salmon Mystery

Sarah, a 7th grader, logs on to the Environmental SuperSleuth computer program for the first time as she’s hanging out with her friends after school. It asks her to enter her first name and the city where she lives.

The program gives her a choice of mystery cases to solve, suggesting that she start with one near her home town of Seattle. The program tells her that the cases are all based on real life environmental problems. Sarah clicks on “The Mystery of the Dying Salmon”

Sarah reads the scenario and is grossed out by the picture of the dead fish. She uses the software to “interview” locals and experts about the dying fish population. She knows that Avery Creek is a real river somewhere nearby.

Sarah’s friend who is also hanging out after school has played this game before, and is now an “Experienced Detective”, while Sarah is just a “New Investigator”. Their goal is to become a “Super Sleuth” by the end of the school year!

Sarah finally saves her game and returns home that afternoon. At dinner when her parents ask what she learned today, Sarah talks about the new computer program she used. She asks where Avery Creek is and tells her parents about the dying salmon.

After solving her first mystery case, Sarah gets information on what she and her family can do to help save the salmon. She shares that information with her parents, and the following week she and her family join a creek clean up.
Prototype of The Environmental SuperSleuth

The case begins with an audio and visual account of the current mystery. The program gives the learner clues as to where he/she should start.

Students can “interview” locals and experts. When the user clicks on an interviewee’s name a short video clip plays.
Multiple-linked representations help the learner to understand the complex data presented.

Learners can take notes and organize their data and thoughts in “My Notebook”.
Features/Functionality

- **Mystery Cases**
  - **Narrative/Scenario**
    - Students see pictures of the scenario (rivers, dead fish, etc.) and hear an audio narrative of an authentic, current environmental problem.
  - **Locally situated**
    - Environmental cases near their home town are suggested.

- **Difficulty Levels**
  - The complexity of the cases are based on students’ experience and performance on prior cases.
    - New Investigator
    - Experienced Detective
    - Super Sleuth
Features/Functionality, Cont.

**Interviews**
- Students can choose to interview local people (teachers, students, reporters, etc.) and experts (scientists, economic experts, etc.).
- Short video clips of interviewees are played.

**Data Collection**
- Students can collect scientific data as evidence.
- Multiple-linked representations are used to help students understand complex data.

**Electronic Notebook**
- Students can gather their thoughts and evidence in the personal notebook.
- The data can be sorted into hypotheses or evidence for or against.
- Free style notes may also be taken.
Features/Functionality, Cont.

Revealed Strategies

- As students uncover some of the causes behind environmental problems, the program reveals strategies students can use to help the cause (e.g. join Creek Clean-ups, etc.)

Help Button

- If the learner gets stuck, he/she can use the help button to get a hint or clue.
- The learner can also get context-sensitive help to use the interface.
Theoretical Justifications

**Intrinsic Motivation** (Malone and Lepper)

According to King and Tester (1999), the three main components of a successful persuasive environment are:

1. **providing the fantasy environment** - the program provides engaging, real-world problems in the context of a mystery that the student detective must solve.

2. **giving the user control over the environment** - the program allows the learner to construct their own evidence through interviews, data collection etc.

3. **giving the user positive reinforcement for performing the target behavior** - the program rewards the learner at each step, and when they solve and use their knowledge to save the environment.
Theoretical Justifications, Cont.

**Tailoring**
- The program uses information about the learner to:
  1) suggest mystery cases located near the learner’s home town
  2) adjust the difficulty level according to the learners prior experience and performance with previous cases.

**Positive Feedback**
- While the learner is attempting to solve a case, steps that he/she makes towards a solution is rewarded with positive comments (e.g. “You’re getting closer!”, “That was a great idea to interview the local reporter!”, etc.)
- When the learner has solved the mystery, he/she is shown what has been done to help solve the problem, and is made aware of opportunities to help.

**Emotional Appeal**
- The introductory screen, data, and videos show pictures of healthy and unhealthy wildlife, appealing to the learners’ emotions to save the environment.
Theoretical Justifications, Cont.

**Social Proof**
- The program leverages social proof by showing the learner what real people are doing to save the environment. In each mystery, real locals and experts tell how they are helping out. This strategy encourages the learner to take action on their own.

**Recognition**
- As learners solve more mysteries their “Sleuth Level” increases until they became a Super Sleuth.
- Although students do not play “against” each other, they may compare the “Sleuth” levels that they have attained.

**Seduction**
- Revealing environmental protection strategies as the user uncovers problems encourages the learner to continue learning, finding more causes, and revealing more strategies.
Shortcomings of Design

- Environmental problems are extremely complicated and difficult to “solve”
- Scientific evidence may need to be updated frequently
- It is time-consuming to produce interviews with locals and experts for every mystery case
- Asking students for information about their location is a sensitive issue
Expansion - What else is possible?

Other form factors or ID possibilities
- Networked game where learners must work together on mystery cases
- More “game-like” interface in which the learner walks around virtual worlds to interview and collect data.
- Interface adapted to handheld devices

Other features and interactions
- Have students speak with real scientists (synchronous or asynchronous)
- Use simulations rather than real-world cases (more simplified and maybe easier to understand)
- Role-playing a city policy-maker – making decisions about what actions should be taken
- Showing how an individual’s pollution level can add up to affect the environment.
Next Steps in Design Process

- Get feedback from teachers, students, and scientists
- Develop Mystery Cases
- Develop working prototype
- User-test with students in 6th through 8th grade
- Iterate on feedback from user-tests
- Conduct focus groups
- Implement