Explore Energy: Designing a web portal and curriculum for Texas middle school students

Abstract
Our goal is to develop a website for use by Texas middle-school earth science teachers and students, providing them with a dynamic and cost-effective way to learn about energy and conservation. Using information obtained in our literature review, we developed personas for two middle-school students and a teacher to anchor our website design, always keeping our target user population in mind. The website was designed to be easy for students to search and navigate, with engaging interactive media and activities, while also allowing teachers to quickly find the resources they need. After developing a functional digital prototype, we plan to implement our usability study to obtain feedback from Texas middle school students and teachers.

Profiles:
- **Ellie**: 11-year-old girl from a family with a limited income. Her parents are both present but have different work schedules, which affects her behavior at school. She makes average grades, but does not enjoy school and would rather spend time in the library or computer lab than in the classroom with the other students. Although she doesn't have a computer at home, she has learned to use the computer for many other things besides homework—mainly watching videos and social networking. Ellie has learned to use the computer for many other things besides homework—mainly watching videos and social networking.
- **Jesse Turner**: 11-year-old boy from a middle-class family. He is a baseball enthusiast, wanting to prove he is no 'four eyes' when it comes to sports. He is self-conscious about them; he is fittingly competitive in English (particularly grammar). He wears glasses and is a tad overweight, although his favorite subject is history and his least favorite is math. Jesse is a 'typical' American 11-year-old, in so much as he is completing his fifth grade and learning about renewable energy. He has learned a lot about renewable energy from educational computer games, and his favorite subject is history. He is completing his fifth grade and learning about renewable energy.

**Site Architecture**:

<table>
<thead>
<tr>
<th>Site Architecture</th>
<th>Mockups:</th>
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<tbody>
<tr>
<td>[Diagram of site architecture]</td>
<td>[Digital mockups of the website]</td>
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**Process and Methods**

**Requirements Analysis**
- Literature Review: Develop Personas
- Conceptual Design: Site Diagram
- Information Architecture: Task Diagram

**Mockups and Prototypes**
- Paper Mockups, Digital Prototypes

**Evaluation**
- Task Analysis: User Testing
- Regression Testing

**Production**
- Front-end development
- Back-end development

**Launch**
- Quality Assurance
- Promotion

**User Needs Analysis**
- Competitive Website Analysis

**Search Results**
- **What is Energy?**
- **What are Fossil Fuels?**
- **What is Renewable Energy?**

**Our Plan for Usability Testing**

**Participants**
- Middle school students recruited from after-school science club
- Small sample size due to constraints of working with children

**Task Sessions**
- One on one researcher/student sessions
- 2-3 minute exploration of site without instruction
- 20 minutes to complete tasks
- 10 minute semi-structured interview

**Sample Tasks**
- Find a map of the extent of the recent oil spill in the Gulf of Mexico.
- Find three examples of ways to save energy.
- Find an eye-witness account of the discovery of oil at Spindletop.

**Sample Questions**
- What did you like best about the website?
- Was there anything you noticed that you didn’t like about the website?
- What would you think would make the website better?
- On a scale of 1-5, where 1 is the easiest and 5 is the hardest, how easy or hard was it to complete the tasks using the website?

**Data Collection**
- Video recordings of task sessions and semi-structured interviews
- Data logs from task sessions

**Our website’s usability will be graded on the children’s ability to complete the tasks, and their perception of the interface—is it fun? boring? easy? Feedback will be incorporated in our design process.**

**References**