Designing digital resources
FOR and WITH middle school-aged youth

Sarita Pillai
Education Development Center, Inc.
Overview

• Education Development Center, Inc.
• NSDL Projects
  – Gender & Science Digital Library (gsdl.org)
  – Effective Access Research Project
  – The FunWorks (thefunworks.org)
  – MSP2: Designing a series M/S of Virtual Learning Experiences for youth (VLEs)
Process

• Literature Review
• Qualitative & quantitative research with youth and educators
  – Online Surveys
  – Focus Groups
• Youth co-design team
• Pilot testing with youth and educators
MSP2

- Online Survey
  - 440 middle school youth from across the nation
  - 617 middle school educators from across the nation

- Youth and Educator Focus Groups
  - 5 middle school youth from Boston, MA
  - 6 middle school educators (NSTA)
Categories of Data

• Computer access and use
• Technology use and web design preferences
• Self-efficacy with technology
• STEM career perceptions
• Science/math topics
• Favorite websites
• Evaluating online information
# Computer Access/Use

## Computer Use in Science Course

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>About Daily</td>
<td>53</td>
<td>12.0%</td>
</tr>
<tr>
<td>Weekly</td>
<td>88</td>
<td>20.0%</td>
</tr>
<tr>
<td>About Monthly</td>
<td>111</td>
<td>25.2%</td>
</tr>
<tr>
<td>Hardly Ever</td>
<td>54</td>
<td>12.3%</td>
</tr>
<tr>
<td>Never</td>
<td>7</td>
<td>1.6%</td>
</tr>
<tr>
<td>Missing</td>
<td>127</td>
<td>28.9%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>440</td>
<td>100%</td>
</tr>
</tbody>
</table>

## Computer Use in Math Course

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>About Daily</td>
<td>28</td>
<td>6.4%</td>
</tr>
<tr>
<td>Weekly</td>
<td>35</td>
<td>8.0%</td>
</tr>
<tr>
<td>About Monthly</td>
<td>44</td>
<td>10.0%</td>
</tr>
<tr>
<td>Hardly Ever</td>
<td>113</td>
<td>25.7%</td>
</tr>
<tr>
<td>Never</td>
<td>71</td>
<td>16.1%</td>
</tr>
<tr>
<td>Missing</td>
<td>149</td>
<td>33.9%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>440</td>
<td>100%</td>
</tr>
</tbody>
</table>

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**Do you think more of your classes could be taught using the Internet?**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>197</td>
<td>45%</td>
</tr>
<tr>
<td>No</td>
<td>41</td>
<td>9%</td>
</tr>
<tr>
<td>Not Sure</td>
<td>75</td>
<td>17%</td>
</tr>
<tr>
<td>Missing</td>
<td>127</td>
<td>29%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>440</td>
<td>100%</td>
</tr>
</tbody>
</table>

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www.msteacher2.org
Technology Use

• School vs. non-school use
• Consumers vs. producers
• Online gaming
• Social networking
  – 71% post messages to friends’ pages
  – 67% send private messages (similar to email) to friends
  – 52% post comments on friends’ blogs or pictures
  – 38% send group messages (blanket messages)
  – 28% send indirect messages (“poke,” “wink,” “kudos”) to friends
  – 6% use chat functions to talk to friends*

• Finding educational sites
## Self-Efficacy with Technology

### How comfortable are you using computers?

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Comfortable</td>
<td>203</td>
<td>46%</td>
</tr>
<tr>
<td>Comfortable</td>
<td>87</td>
<td>20%</td>
</tr>
<tr>
<td>A Little Comfortable</td>
<td>18</td>
<td>4%</td>
</tr>
<tr>
<td>Not At All Comfortable</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>Missing</td>
<td>128</td>
<td>29%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>440</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Figure 1. I am good at collecting information using technology.

- Strongly Agree: 34%
- Agree: 36%
- Neutral: 13%
- Disagree: 1%
- Strongly Disagree: 13%
- Missing: 13%

### Figure 3. I know how to use technology to solve everyday problems.

- Strongly Agree: 25%
- Agree: 34%
- Neutral: 19%
- Disagree: 7%
- Strongly Disagree: 2%
- Missing: 13%

### Figure 5. I am good at using technology to better understand ideas I learn in school.

- Strongly Agree: 23%
- Agree: 35%
- Neutral: 21%
- Disagree: 4%
- Strongly Disagree: 3%
- Missing: 14%
Design Preferences

• Positives:
  – clear layout, easy to navigate
  – use of color, balance between text and images, use of animation/interactive content, not childish
  – limited introductory information
  – multiple search options, limited search results
  – dictionary feature
  – ‘original’ content
  – ability to create/add content
  – minimal ads
Careers & STEM topics

• Teacher, Veterinarian, Lawyer, Doctor, Police Officer

• Science Topics
  – Life Science, Chemistry/chemicals, Human body, Animals/zooology, Volcanoes

• Math Topics
  – Arithmetic, fractions, algebra, geometry
Analysis

- Use online/resources in science class (vs. math class) — youth would like to see more technology incorporated into their classes
- Most youth are online consumers and some are online producers, find value in both consuming content and creating it
- Mastery of basic computer functions (report writing, Internet searches)
- Approximately 25% of the sample used online social networking sites at least once a day
Analysis

- Science topics of interest include life science and chemistry
- Math topics of interest include arithmetic & fractions
- Identify trustworthy sites through adult recommendations, site URL stem, .org url
- Prefer multiple methods of finding these things, dislike when too many/too few options are presented to them
Analysis

- Direct answers, limited text, videos, and interactivity
- Dislike ads, not enough original information, childish look and feel
Youth Co-Design Teams

• Crucial to ensuring that learner-centered design principles are upheld throughout the creation of a deliverable
• Aid in conceptualization, design, and testing of designs with the intent of creating a prototype of a final deliverable
• Diversity of youth participants, recruited via partner organizations
• EDC developed curriculum, team is convened 1-2 times per week over 2-3 months
• End result: products that reflect the vision of these young designers as well as the needs and interests of their peers
Meet the Team!
The Design Team

- 9 students, 13-15 years old, 7\textsuperscript{th}/8\textsuperscript{th} grade
- Recruited through a community technology center
- Urban setting – Boston
- Application process
- Participation incentive
- Extensive IRB process – not for the faint of heart!
Design Team Activities

• Pre-assessment of computer/Web knowledge/skills
• Identification of relevant and engaging Web elements
• Creation of STEM Web site mock-ups
  – Paper
  – Balsamiq
• Critique of STEM Web site mock-ups
• Post-assessment of computer/Web knowledge/skills
Designs
Designs
Lessons Learned

• Trust issues and group dynamics
• Design partner vs. Mentor
• Balancing data collection and active participation
• Continual adjustments to curriculum
• Constructive criticism
• Impact of importance
Thank you!

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