



Introduction

This research summary outlines findings from an extensive web survey conducted by the Career Resources Network project, a digital library project funded by the National Science Foundation's National STEM Digital Library program (<http://www.nsdlib.org>). The aim of the survey was to determine the web site design preferences of youth ages 11 – 15 in grades 6-9, in terms of design elements such as color, layout, navigation, and interactivity level.

Project Overview

The Career Resources Network project is being conducted by the Gender, Diversities & Technology Institute at Education Development Center Inc. The aim of the project is to provide online exploration of science, technology, engineering, and mathematics (STEM) career information in a highly interactive and engaging way. In addition to providing easily accessible on-line career development resources, this digital library will offer interactive services to help diverse populations of middle and early high school students investigate STEM careers. The project puts particular emphasis on engaging currently underrepresented populations in STEM education and careers—females, minority populations, students of poverty, and students with disabilities—using an array of strategies that promote experiential learning to both encourage and challenge students.

To accomplish this, a middle school student design team is closely involved in the design, development, and deployment of the collection, such that the final site is the outcome of a user-driven and user-centered collection building project. The design of the collection will be such that students can use it with minimal to no supervision or assistance from adults. It is expected that students will use the collection to explore their own interests, and to access information about STEM careers, including their own career development needs.

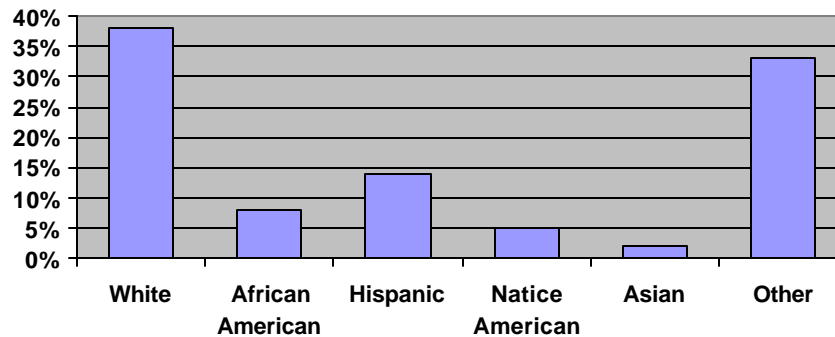
Methodology

The purpose of the web surveys was to establish a baseline of data on web design preferences of middle school youth. This data, once analyzed, would further inform the overall design process, in conjunction with the youth design team. The survey was administered on-line using SurveyMonkey.com and on paper between March and June of 2004. Paper survey responses were then entered into the on-line template, and data analysis was conducted through the SurveyMonkey data manipulation software. Existing web sites that were included for review by respondents as part of the survey are referenced in Appendix A. A full copy of the survey is included in Appendix B.

Survey Demographics

The survey was administered to 183 students between 6th and 9th grade - with 38% of the group in grade 6, 32% in grade 7, and 14% in grade 8. The majority of respondents (90%) were between 11 and 13 years old. The male/ female ratio of participation in the survey was 60/40 respectively. In terms of race/ ethnicity, 38% identified as white, 33% identified as "other", 14% Hispanic, 8% African American, 5% Native American, and 2% identified as Asian (see Figure 1).

Figure 1 – Racial/Ethnic demographic of respondents



Survey Results

Color: Blue was mentioned by 49% of respondents as a color they would use if they were designing a site for kids their age (including battery charged blue, baby blue, light blue, and blue). Green came in a close second at 24% (including lime green, bright green, and green). Orange, black, purple all clustered together in third place for 19% of the respondents. Pink, red, yellow and "bright colors" came in fourth and white was at the bottom of the list. This seems to suggest that the youth sampled preferred these "cool" colors to "warm" colors.

Layout & Images: 35% of respondents, the majority, preferred sites with more images/colors/activities rather than less. Those surveyed showed a strong preference for a wide variety of graphics, "entertaining" and recognizable or famous characters, images that are clear and easy to see, and those that are colorful. In terms of the kinds of images preferred, animals were mentioned most often, followed by cartoons and then photographs.

Ease of Navigation: Respondents preferred sites that they considered easy to find information on. Sites that got good ratings for navigation were often described as having all the necessary information readily available on the first page of the site. For example, some quotes from students included "All the links are on the first page", and, "the activities are right in front of you no matter where you go." Good organization, use of color and fonts were also mentioned

as adding to the ease of use. One student mentioned disliking a site because it had no search bar - which suggests that there are certain expected features or norms of navigation that web-savvy youth have come to expect.

Overall Preferences - Likes: In the review of specific sites, interesting games topped the list of reasons that respondents liked a given site. Beyond games, children seem to look for sites with a lot of activities and interactivity, or sites that were of topical interest to them and included useful information (e.g., codes for video games, or information for a school project). Kids did mention that they would use sites that they did not "like" if they needed the information provided on the site - i.e., they needed it for school.

Overall Preferences - Dislikes: The most commonly cited reason that kids did not like a web site was that it was boring – no fun facts, colors, activities or interesting information. Respondents did not like sites if they were only words or had too much "talking" (audio). They rejected sites for having nothing to do or see that was engaging or entertaining. Kids also disliked "long" wait times for loading games or images. They also did not respond well to the notion of paying for games, or sites that seemed to be designed for much younger children. Designing activities with the appropriate level of difficulty seems important for engaging students - too easy was often followed by a comment about the site being too childish. The characters or guides were often described as "babyish or kiddish" and were disliked by more boys (43%) than girls (14%).

Considerations for Designers

In addition to the suggestions mentioned in above, additional considerations for designers of online resources are listed below:

Navigation

- Label links clearly; create categories/ links that stand out by using large, playful fonts or color, such as blue and green.
- Only link to other sites if necessary, otherwise provide an explanation as to where a link is going and why.
- Design a Home page that includes a large and visible menu, that explains what is on the site and where to go, and that clearly marks where a user should 'Click' to begin.

Graphics

- Include high quality graphics that are interesting to look at, but ensure that load time for a site is as short as possible.
- Include age appropriate characters and guide s- students were very sensitive to perception of sites as "childish." Use images of middle school kids or mature-looking cartoons.
- Users should be able to turn off characters' voices/images and only turn back on as needed.
- Characters should be helpful - e.g., give directions, provide hints, and give more information when asked.

Instruction/Text

- Text should be informative but not include too much reading. Ideally, useful/informative text should be provided in small chunks, with an option for more detail available for those that want it.
- Include clear instructions for games. It is important to note the level of the games and keep the level of text and games consistent throughout the site - students need a gauge of what level they should/could be at.

Interactivity

- Provide a high level of interactivity in the activities, and provide a variety of activities both in the types of games they can play on one site and within each game.
- Give options for how to complete activities - e.g., clarify that there may be no one correct answer, or that there are different ways to solve a puzzle or to reach an end goal.
- Students noted that they liked that they were 'learning without knowing they were learning' - e.g., they liked the educational aspects of the sites and appreciated that they were fun too.

Conclusion

Several key themes emerged from this research in terms of the site design preferences of middle school students. Youth connected well with interactive sites that balanced visual and textual elements in a way that accounted for their varying learning styles and preferences. When presenting educational content online, it seemed important to youth that the content be connected to relevant points of interest in their lives. This seems to imply a need to provide various contexts in which the information might be of use to young people. Other themes included consistent and clear navigation elements, moderate to high levels of interactivity, low site load times, the use of games and entertainment with underlying educational objectives, and age-appropriate uses of graphical images. As with any product or user demographic, it is important that technology designers involve their audience early in their design phase, and that the process for collecting user feedback is an iterative one that continually informs the design and development cycle of any technology.

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Project Director, Sarita Nair, snair@edc.org

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APPENDIX A - Sites Reviewed

<http://www.wonderville.ca/home.html>

Developed by the Science Alberta Foundation Incorporates science, math, technology and career information in a cartoon like world.

<http://www.ology.amnh.org/index.html>

This site, from the American Museum of Natural History, is organized around seven different areas of science with related activities and interviews with scientists.

<http://pbskids.org/africa/index.html>

This site from PBS Kids contains photo journals of four schools in Africa and interactive activities.

<http://www.dignubia.org/index.php>

From Education Development Center, Inc., DigNubia: Exploring the Science of Archaeology lets students explore the tools archaeologists use, maps of archaeological digs, objects found, and learn about real archaeologists

<http://www.newbaybridge.com/classroom/engineeringfor.html>

Developed by EduWeb, this site contains profiles of all of the people involved in designing and creating the New Bay Bridge in San Francisco.

<http://speakout.terc.edu>

From TERC in Cambridge, MA, this site is an online magazine created by and for middle school girls as part of the "Eyes to the Future" project - a science tele-mentoring program that uses the Web to link middle-school girls with high-school girls in their school districts and with women who use science, math, and technology in their careers.

<http://www.microbe.org/index.html>

From the American Society for Microbiology, this site is organized into five related sections. Students can solve a microbe mystery, read about microbes in the news, conduct experiments, learn about hand washing, and learn about careers.

<http://gettech.org/>

GetTech is an online resource that helps students, teachers and parents plan for careers in technology, engineering, manufacturing and science.

<http://www.pbs.org/wgbh/buildingbig/profile/>

This site allows students to explore large structures and what it takes to build them with BUILDING BIG™, a five-part PBS television series and Web site from WGBH Boston.

<http://www.dnr.state.wi.us/org/caer/ce/eeek/job/index.htm>

From the Wisconsin Department of Natural Resources, Environmental Education for Kids (EEK) is an online magazine for grades 4-8. EEK provides current and accurate information on natural resources, along with career information; and it offers students the opportunity to take part in activities, make seasonal observations, and share stories and artwork

APPENDIX B – Web Site Survey

Part I: Web Site Exploration

SECTION 1: Choose ONE of the following Web sites to review.

DIRECTIONS: Circle the name of the Web site you review.

Ology Speakout! DigNubia: Exploring the Science of Archaeology

Africa for Kids Wonderville

None of these - I reviewed a Section 1 Web site

DIRECTIONS: Explore the Web site: LOOK AT THE HOME PAGE, TRY SOME ACTIVITIES, and VISIT SEVERAL DIFFERENT PAGES. Then answer the questions below.

- 1) Was it easy to find information and activities on this Web site? Why or why not?
- 2) Which activities did you try? Did you like them? Why or why not?
- 3) Did you like the characters/ guides and colors on the Web site? Why or why not?
- 4) Would you tell your friends to visit this Web site? Why or why not?
- 5) What do you LIKE about this Web site?
- 6) What do you NOT like about this Web site?

PLEASE RATE this Web site. Circle 1 number in each row.

	FANTASTIC	GREAT	OK	BAD	TERRIBLE
Colors	1	2	3	4	5
Pictures / Characters	1	2	3	4	5
Name of Web site	1	2	3	4	5
Activities	1	2	3	4	5
Amount of Text and Images	1	2	3	4	5
This site is...	1	2	3	4	5

SECTION 2: Choose ONE of the following Web sites to review.

DIRECTIONS: Write the name of the Web site you chose to review.
Stalking the Myterious Microbe BUILDING BIG: Who builds big?

GetTech.org Environmental Education for Kids: EEK!

None of these - I reviewed a Section 1 Web site

DIRECTIONS: Explore the Web site: LOOK AT THE HOME PAGE, TRY SOME ACTIVITIES, and VISIT SEVERAL DIFFERENT PAGES. Then answer the questions below.

- 1) What do you LIKE about this Web site?

- 2) What do you NOT like about this Web site?

- 3) Is it easy to find information and activities on this Web site? Why or why not?

- 4) Which activities did you try? Did you like them? Why or why not?

- 5) Do you like the characters/ guides and colors on the Web site? Why or why not?

- 6) Would you tell your friends to visit this Web site? Why or why not?

PLEASE RATE this Web site. Circle 1 number in each row.

	FANTASTIC	GREAT	OK	BAD	TERRIBLE
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Activities	1	2	3	4	5
Amount of Text and Images	1	2	3	4	5
This site is...	1	2	3	4	5

SECTION 3: About Me

1) My name is:

2) I am in grade (check one)
 5 6 7 8 9
Other (please specify):

3) My age is:

The next set of questions are optional. Knowing more about you helps us make a better Web site. But, if you don't want to answer them, you don't have to..

4) I am a (check one)
 Girl Boy

5). My race/ethnicity is:
 African American Asian Multi-racial Hispanic
 Latino Native American White
Other (please specify):

5) What language(s) do you speak at home?