Tuna Anglers in the Online OOS World:

A pilot study of how usability testing can guide the development of Ocean Observing Systems (OOS) data products and web portals

CoSEE
CENTERS FOR OCEAN SCIENCES EDUCATION EXCELLENCE

MACOORA
Mid-Atlantic Coastal Ocean Observing Regional Association

Executive Summary:

Conducted by: the Centers for Ocean Science Education Excellence Networked Ocean World (COSEE NOW)

Funded by: Mid Atlantic Coastal Ocean Observation Regional Association (MACOORA)

Background

On August 21-22, 2008, the Center for Ocean Science Education Excellence Networked Ocean World (COSEE NOW), and the Freeport Tuna Club, collaborated with a consultant, Cia Romano from Interface Guru, to conduct website usability testing with a group of tuna anglers to better understand how ocean observatory data related to their fishing needs can be communicated via Web-based visualization displays such as maps, charts and other data sources. This work was done to support the mission of MACOORA and COSEE NOW to learn: 1) to use the results of the test to improve visualization and navigation of data displays for MACOORA member institutions and 2) learn the fundamentals of website usability testing.

The COSEE NOW is one of 11 National Science Foundation funded centers dedicated to promoting collaboration among ocean scientists and educators with the ultimate goal of improving ocean literacy (see http://www.coexploration.org/oceanliteracy/ for more information) for a variety of target audiences. COSEE NOW's central objective is to develop a virtual "community center" website where scientists, educators, policy makers, and the public can exchange information, collaborate and share education/outreach techniques, such as lesson plans, visualized data or media presentations, that relate to coastal and ocean research, in particular using observing systems data.

Interface Guru is a nationally known consulting firm that assists corporations, government agencies and non-profit organizations with optimizing their websites through usability testing, information architecture, and interface design.

Methods

Our objective for the usability testing was to understand:

- What environmental information are anglers looking for when going fishing, in this case tuna fishing?
- How do anglers get this information?
- What is their experience getting this information online?

Usability testing is a digital media evaluation method that measures the effectiveness of a Web product with members of a target audience. This type of testing is useful when you are:

- Verifying the appeal of current OOS design
- Verifying the effectiveness of a design
- Modernizing an existing design

- Determining usefulness of the content
- Determining how best to display data so that it is useful to the data user.

We contracted with Interface Guru to provide one day of training on usability testing and analysis. Our objective was to increase our collective (MACOORA and COSEE NOW) capacity to provide superior service to our Ocean Observing Systems (OOS) audiences. As part of the training, we engaged a selected group of anglers from the Freeport Tuna Club in Freeport, NY, in a usability test of several web sites and web products to collect relevant data and put the training into practice for the COSEE NOW team. We explore these questions in the context of using a series of participants including the following:
Website interfaces

COOLroom website (www.thecoolroom.org)
COOLroom redesign test site (**http://marine.rutgers.edu/~heifetz/coolroom/**)
Sea Surface Temperature (SST) website (**http://marine.rutgers.edu/cool/sat_data/?notthumbs=0&product-sst**)

Data interfaces

SST data images (**http://marine.rutgers.edu/cool/sat_data/?notthumbs=0&product-sst**)
Glider data image (**http://marine.rutgers.edu/~sage/lsc/data/glider_ru22.gif**)
Codar data image (**http://marine.rutgers.edu/~sage/lsc/data/ny_rt.gif**)
Codar data animation (**http://marine.rutgers.edu/~sage/lsc/data/ny_24h.gif**)

We followed the foundations of a typical usability test by:

1) Recruiting a group of user representative of our target audience. This was done with the support and guidance of Mr. Jeff Yapalater who engaged members of his fishing club to participate in the study. All 7 of our participants were over 45 years old from variety of professional backgrounds, and fished at least weekly (mostly offshore) for tuna and shark. Five of the 7 participants used the Internet daily.
2) Meeting with them at a neutral location. The usability test was set in a conference room at the Best Western in Rockville Center NY.
3) Observing and interviewing them individually as each performs common tasks on a Web site. A total of 7 participants were involved in the study.
4) Audio & video recording the conversation and tracking the viewing of the Web site in real time. All of the interviews were recorded using software and a computer system owned by Interface Guru.

Results

During this usability test, we interviewed seven anglers, each for about an hour. Based on usability test research, 5 participants are adequate for determining most problems with websites (Nielsen, 2000). Below are the highlights of our test results.

1) *Test Subjects Use of Data*

Five of the 7 participants responded yes when asked if they use the Internet to search for information before going fishing, while 1 said sometimes and 1 said no. Surface temperature or sea temperature was commonly (6 of 7) mentioned as a type of fishing

information they find on the internet. Other types of information included weather and wind conditions, bait information, tides and tide tables, solar/lunar tables, chlorophyll, and turbidity. The role of using online data was to locate conditions where fish are likely to be. Three of the 7 said that getting this type of information is important so as not to waste money (for gas) going to the low yield locations.

2) *Retrieving Data*
As part of the study we explored what the online data-retrieval experience is like for Freeport anglers. In general the test subjects started with a location where they plan to fish and then looked for sea surface temperature (SST) images. They look for the most recent image with the most data (i.e., least cloud cover) for their fishing location. They then look for temperature breaks or areas where there are dramatic side-by-side temperature differences. In addition, they like to see bottom depth and topography at the break locations.

See attached PowerPoint, slide 8 & 9 for more detailed information on participants' experience retrieving online data. See video clip example (1) from video archive.

3) *Data Visualization*
Test subjects reviewed 4 types of data displays including sea surface temperature (SST), glider data, CODAR and an animation of CODAR images. Our general findings are that the data can be organized by location either via a list (4 participants) or a map (3 participants). Participants preferred maps with a zoom function and the ability to grab and move map features. They preferred that water temperature images be listed in Fahrenheit along with the local time stamp (date and time). They suggested value-added features such as well defined lines outlining temperature breaks and mouse over of latitude and longitude. Finally, for bottom depth and topography, test subjects outlined the need for detailed (5 degree) lines and listing of major or commonly known features.

The participants struggled with the units for each data display including the time stamp and the chart axes (kilometers verse miles, and Fahrenheit verses Celsius). All data visualizations need to use simple and clear language with avoidance of scientific jargon and acronyms. For example, participants noted that they were unfamiliar with the LEO area featured in the Rutgers University SST site (n = 4), the COOL and COOLroom acronyms (n = 3), forecast (n = 3), CODAR (n = 2), the tag line "underwater weather" (n = 2), Flash (n = 1), and MODIS-AQUA Backscatter (n = 1).

See attached PowerPoint, slide 10 for more detailed information on participants' impressions of the data displays.

4) *Understanding and Using Data*
Overall, the participants (6 of 7) mentioned using SST imagery to help decide where to fish (i.e., look at ahead of time and sometimes print and bring on trips). None of the participants are using glider data, whereas (2 of 7) participants said they would be interested in using it if trained on its interpretation. Five of (7) of the participants were

interested in using animations of data (CODAR) if it would/could be used in conjunction with something like temperature data or currents.

When looking at the glider displays, all (7) requested more information/training on interpreting the displays. Initial impressions of what they thought they were looking at included temperature (possible a temperature break), depth, distance, tracklines, buoy tracks, and wave height. Two of the 7 participants noticed that it also displayed salinity and density. Participants (3 of 7) were unclear on how the map related to the transect graphs, but speculated that it may be the rays/lines extending from the coast or the path with dots. Participants were confused by these images at some point, and none were 100% sure of what they were viewing. Only 2 of 7 test subjects thought that this information would be helpful for fishing. One participant mentioned that he could see the thermocline, which is where fishermen generally fish.

See attached PowerPoint, slide 11 for more detailed information on participants' impressions of the data displays. See example (2) from video archive file.

The CODAR static displays also had mixed interpretation with 5 of 7 participants reporting some level of understanding including speculation on temperature, currents, or wind data. Only 2 of the 7 participants were able to more definitively determine currents were being represented after seeing the term “velocity.” One participant who was familiar with currents data determined that the colors represented wave heights. Four of the 7 participants said that current data with temperature would be helpful for fishing. In general, they recommended a text explanation to help them interpret what they are looking at, as well as extending the area that it covers.

See attached PowerPoint, slide 12 for more detailed information on participants' impressions of the data displays.

When viewing the CODAR animation display (6 of 7) participants understood CODAR animation of change in water movement over days, although they could not define the frequency. Two of the 7 participants articulated that it appeared to be water temperature overlaid with currents. Six of the 7 participants did not see the timestamp, with only 1 participant noticing the stamp after a few minutes of looking at the page. Participants (3 of 7) guessed that temperature was represented, along with currents and/or wind. Four of 7 test subjects commented on how fast the picture was changing. The recommendations that were made included adding an explanation of what is being represented, slowing down the image, adding a timestamp and being able to zoom in on a more specific area to see what is going on there. Participants (4 of 7) said that this would be helpful for fishing, particularly if temperature is one of the variables being displayed.

See attached PowerPoint, slide 13 for more detailed information on participants' impressions of the data displays. See video clip example (3) from archive file.

Summary Recommendations

COSEE NOW has the following recommendations for MACOORA and other regional associations attempting to serve the recreational fishing community (offshore tuna anglers in particular):

- *Provide detailed SST imagery*: The offshore recreational fishing community appears to be using SST imagery to help them locate areas of high potential for fishing through the identification of temperature breaks. We recommend providing more detail in the images including the ability to zoom into specific locations (increase resolution), larger areas, mouse over latitude/longitude, and landmarks on land/water, annotating of maps with temperature breaks, and bottom contours, and large scale physical features. A participant commented: "Make it easier to understand, just like using a GPS – needs to be more user-friendly, where do I click, let me slide image back and forth to see other areas".
- *Provide links to other relevant data sources on web interface*: We recommend linking to other reliable sources of weather and tide data to help the recreational fisher people have all the information they need accessible from one web site. One participant noted, "One of the main things we look at is surface conditions, tides, wave heights and wind, for both fishing as well as for safety, since all the other info is useless if it's unsafe."
- *Develop new data displays and tutorials to explain their use*: Participants expressed interest and curiosity about glider data, but many cautioned its potential for limited geographic use (i.e., not having a glider working in an area you are attracted to fishing in such as the Hudson Canyon).
- *Improve data legends and displays*: The participants also expressed interest and curiosity in the CODAR displays. They viewed the larger coverage of area as a real value and similarly requested tutorials to aid them in learning how to interpret the data displays. The animations of data (CODAR example) were very intriguing to the participants. Our recommendations are to clarify/improve the time frame of data (time stamp) and provide tutorial or explanation of what it is/how to read it. We also recommend providing users with the ability to focus in on smaller area and slow down animation for easier interpretation. A number of the participants advocated for combining current direction (vectors) with a temperature (SST) overlay. We also recommend clarifying the color bar scheme (red to violet) which is used for temperature and current velocity but meaning/having different values. This has proven to be a source of confusion for the participants and should be standardized in some way from one visualization to the next.

References
Nielsen, Jakob. **March 19, 2000 @** http://www.useit.com/alertbox/20000319.html
Retrieved on September 14, 2008.
Video Archive files are located at:
http://marine.rutgers.edu/~sage/MACOORA_Usability/

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