Page Design Guidelines for Improving World Wide Web Navigation

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Abstract

Navigation is one of the most critical aspects of browsing pages in the World Wide Web. Users spend a significant amount of time moving from page to page in search of the desired information. The poor usability of Web pages and lack of good navigation tools wastes user time, increases the Internet traffic, and contributes to the user's frustration. This research studies and evaluates three page design practices that can potentially improve the navigation on a Web site. These practices are: the selection of appropriate link names, the adoption of and index of links to pages or topics, and the use of navigation buttons.

1. INTRODUCTION

One of the most critical aspects of browsing pages in the WWW is navigation. Due to the way most Web sites are structured, users spend a significant amount of time moving from page to page in search for information.   The poor usability of many Web pages promotes this problem and is one of the major causes of delays, waste of time, Internet traffic, and user's frustration while navigating the Web. Inappropriate and misleading link names, confusing and disorganized pages, and other usability problems, contribute to the disorientation of users that become easily "lost in hyperspace".

Several alternatives have been researched and proposed to help with the problem of navigation in the Web. Wood, et. al. [1] suggested a method that provides a 3D graph of the place in which the user was located to allow an easier retracing of previously visited pages. Mukherjea, et. al. [2] proposed a method that consisted of showing the context of nodes in a path to provide users extra information about the topics of nodes. Other researchers [3] have proposed a multimodal interface that combines the use of speech and mouse. These projects use speech to overcome the sequential nature of present browsers and to expand the scope of selection of a hyperlink which is restricted by the screen area in the pointer based interaction.

From our heuristics evaluations of Web pages [4,5] we identified three page design practices that could potentially improve navigation on a Web site. These practices are: the selection of appropriate link names, the adoption of and index of links to pages or topics, and the use of navigation buttons.   In the following sections we discuss how these practices can improve navigation and how to integrate them in the page design process.

2. SELECTING APPROPRIATE NAMES FOR LINKS

The selection of names for links is a very critical aspect in the design of Web pages. In most cases the name of a link is the only hint that a user has about the content of the page the link points

to. If the name is misinterpreted, the user could end up reaching a useless page in his/her search for information. This situation results in a waste of time for the user and causes an unnecessary traffic on the Internet. Thus, it is important that this problem be minimized in the design of Web pages.

To get a better understanding of the problem of link naming we decided to conduct a study to determine how well can people guess the content of a page from the link name that refers to it. Fifty links randomly selected from ten commercial home pages (also randomly selected) were used for the study. Sixteen people participated in the study. Each person was provided with a hard copy of the ten home pages with the selected links identified with a number. They were asked to write, in a response sheet, what they though was the content of the page pointed by each of the fifty links. Each response was classified according to the clue that the link name provided about the content of the page it pointed to. The following four categories were used to classify the responses:

> *none* - the link name did not provide an idea of the content of the page
> *wrong* - the link name provided the wrong idea about the content of the page
> *fair* - the link name provided some idea about the content of the page
> *good* - the link name provided a good idea about the content of the page

The category assigned to each response was determined by a consensus of the subjective opinions of three experimenters. The experimenters' opinions were based on the analysis of the content of the fifty pages pointed by the links selected for the study.

The results of the study indicate that in approximately 65% of the cases the names assigned to a link by page designers provide a good idea or some idea about the content of the pages the links point to.   However, a significant number of links do not provide a good hint. In approximately 25% of the cases the link names suggest a wrong idea about the content of a page. Following these kind of links is bound to result in a waste of time. We also found that in approximately 9% of the cases the link names do not provide a clue about the content of the page. These kind of link names could discourage exploration or could result in a waste of time if followed.

An analysis of link names that provided poor clues revealed that in most cases the link name selected by the page designer did not reflect the content of the page it pointed to. In other cases the names were too general and did not provide enough information for a person to get at least a fair guess of the page content. Some of the names were not commonly understood.

Based on the previous analysis we developed the following guidelines for naming links:

- Link names should reflect the content of the page they point to.
- Avoid names that are too general if you can be more specific. For example, it is more meaningful to use:
  > *Crosswords and Comics* instead of *Recreation*,
  > *Deadlines* instead of *Important Stuff*.
- Avoid names that are not commonly understood such as technical words and terms with in-house or local meaning. For example, it is more meaningful to use:
  > *Industrial Affiliates Program* instead of *IAP*,
  > *Computer and Communications Technologies* instead of *Telematics*.

To determine if these guidelines could help page designers to generate more meaningful names we conducted a usability test.   A group of ten people were asked to used the guidelines to provide names for links to six Web pages. Another group of ten people were asked to provide names for links of the same Web pages, without using the guidelines. The link names provided by each participant for each page were classified according to the clue that they provide about the page they pointed to (*good, fair, wrong, none*).

The results of the study indicate that in approximately 62% of the cases, the participants that used the guidelines were able to come up with a link name that provided a good or fair clue about the content of the page it pointed to. However, the participants that did not use the guidelines were

only able to come up with a good or fair name in approximately 45% of the cases. Thus, use of the above mentioned guidelines could help page designer to select names for links that provide a good or fair clue of the content of the page they point to.

3. USING INDEX PAGES

The availability of an index of pages or topics of a Web site could be very useful because it allows a quick access to the pages of the site without much navigation. From our usability studies of guidelines for designing WWW pages [4] we noticed that once the users discover an index page they would frequently return to that page while searching for information on the site.

To determine whether the adoption of an index page can improve the navigation on a Web site we conducted an experiment with two groups of Web users. Each group was asked to perform 15 tasks on a version of a Web site. The tasks required the users to look for specific information from different pages of the Web site. One of the groups performed the tasks on the original version of the site and the other group on a modified version of the site. The modified version of the site included an alphabetical index page. This page consisted of a linear list of alphabetically ordered groups of links to different pages of the site. The header of the page featured the letters of the alphabet as links to an anchor at the beginning of the corresponding group. The header was made static to prevent it from getting out of sight while scrolling the list. A link to this index page was provided in the home page of the site and in the primary pages of the site (the pages pointed by the links of the home page). To prevent any bias towards the use of the index page the users of the modified version were not told about the existence of the index page. All the tasks began on the home page of the site. The time to complete the tasks (excluding page download time) was measured.

The results of the experiment are presented on table 1. The times presented in this table correspond to the average time it took the users to complete the task on each site version. The results indicate that on average the users of the site with index page were able to complete most of the tasks in a shorter amount of time than the users of the site without index page. In eleven out of fifteen tasks the average completion time of the users of the site with index page was lower than the average completion time of the users of the site without index page. The tasks for which the users of the site without index page completed in a shorter average time were four of the first five tasks of the experiment. During these first five tasks many of the users of the site with index page were not aware of the existence of the index page and thus, could not benefit from it. After the fifth task most of the users were aware of the index page and used it frequently to speedup the navigation on the site. Thus, a fair comparison of the two versions of the site should be based on the results of the last ten tasks. It is evident from the results of the last ten tasks that the adoption of an alphabetical index page can improve the navigation on the WWW because it helps the users find information faster.

Table 1. Comparison of Average Times to Complete Search Tasks on Web Sites with and without Index Pages.

Task	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Site A (with index page) (average time in sec.)	52	27	46	13	15	63	64	19	24	17	18	27	16	18	23
Site B (without index page) (average time in sec.)	12	16	41	25	12	107	99	91	31	24	27	118	115	179	47
Time Ratio (Site B/ Site A)	.2	.6	.9	1.9	.8	1.7	1.6	4.8	1.3	1.4	1.5	4.4	7.2	9.9	2.0

We found additional evidence in support of the incorporation of an index page. There were 23 cases in which a user of the site without index page could not complete a task. This contrasts with only two cases on the site with an index page. These results suggest that the incorporation of an index page results in a higher degree of success in the search of information on a Web site.

4. NAVIGATION BUTTONS

The adoption of navigation buttons in Web pages has the potential for improving navigation on a Web site because they facilitate a quick move to key pages of the site. Based on the results of the study with index pages it is evident that an *index* button can be very useful as a shortcut to reach an index page.

The study of index pages also revealed that the users tend to revisit the home page of the site by consecutive activations of the *back* button of the browser. This navigation method is ineffective if the back button must be activated more than once because the user would be revisiting pages that serve no purpose in their search for information. A faster way to get to the home page can be achieved by providing a button or link in each of the pages of the site that link to the home page. By pressing this button the users will get immediately back to the home page of the site without having to revisit unnecessary pages.

Other buttons such as a *predecessor* button (one that links to the page that is the logical parent of the current page) and a *top* button (one that links to the top of the current page) could be useful. However, we have not conducted studies that can support their usability.

5. CONCLUSIONS

The majority of the link names found in Web pages provide a good or fair clue of the content of the page they point to. However, there is a significant number of link names that do not. These names can mislead the users to access pages that are not of his/her interest. This problem can be improved if page designers follow simple guidelines for naming links such as the ones proposed in section 2.

Our studies with index pages demonstrated that the navigation time can be reduced by adopting and index page on each Web site and providing a link to this page in most of the pages of the site. An index page consisting of a linear list of alphabetically order links and a static header with the letters of the alphabet have proven to be very useful.

The adoption of an *index* button and a button to reach the home page of a site has a good potential for improving navigation. However, more experiments need to be conducted to study the effectiveness of these and other navigation buttons.

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