

Organizing Web Site Information: Principles and Practical Experience

A CHI 99 Workshop

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Introduction

As web sites continue to grow in their complexity, one of the most important usability design decisions is how to structure the web site topic hierarchy. This decision lays the groundwork for designing other aspects of the site, e.g., the home page table of contents, and for categorizing new documents in the topic structure over the life of the site. Organizing web sites is a timely topic as evidenced by the recent spate of publications on this topic [1] [2] [3] and by NIST's recent release of a tool, WebCAT, to help users participate in organizing their web site. More significantly, the organization is probably the limiting factor on success for web sites that provide useful information.

If anything is clear about the organization of web sites, it is that there is no single best way to go about it. Different types of web sites seem to demand different approaches to organization. For example, a site geared toward product support might use a task-oriented scheme that steps users through a process of problem-solving. Other sites, such as an online shopping site, might be organized according to categories of products, in order to allow efficient browsing. Other sites might be organized based on an analysis of user roles.

Designers who must choose among these schemes must also choose appropriate analyses to inform the design of the web site structure. These include item clustering techniques, user performance at finding documents using various prototype web site organizations, studies of user roles and tasks, and analyses of the material to be included in the site.

Objectives

The primary purpose of this workshop was to discuss and develop solutions for organizing information in web sites taking into account: (a) theories about how humans process categories and (b) solutions arrived at in the course of the practice of web site design. A secondary goal was to share techniques that can be used to gather data to inform decisions about web site organization. The workshop provided a forum for researchers and practitioners to share experimental results and practical experiences in approaches to organization that have worked well (or not so well).

Participants

The workshop participants, including the organizers, were a diverse group of 17 people. They were web designers, human factors practitioners, and researchers. Some worked for for-profit companies, large and small, and others for not-for-profit institutes or universities. Most were from the United States, but representatives from Europe and Asia also participated.

John Armitage (Aaron Marcus Associates), Peter Boersma (General Design), Ralph Brandi (Lucent Technologies), Ed Huai-hsin Chi (Xerox Palo Alto Research Center), Kate Dobroth (American Institutes for Research), Haim Hirsch (Edmund Publications Corp.), Demetrios Karis (GTE Labs), Jinwoo Kim (Yonsei University), Sharon Laskowski (Nat'l Institute of Standards and Technology), Paul McInerney (IBM), Trish Miner (Microsoft Corp.), Brian Poel (Fine.com International, Inc.), Hal Shubin

(Interaction Design), Sharon Smith (Compaq Computer Corp.), Steve Toub (Argus Associates), Jack J. Yu (Eastman Kodak Company), John Zoglin (Bay Networks).

Structure of the Workshop

In the morning of this one day workshop the group discussed four topics in an attempt to distill our experiences into a set of principles of web site organization that can be applied in different design situations. A month before the workshop each participant voted for four topics to discuss out of ten topics that were found in one or more of the position papers. The four topics that got the most votes were

- Taxonomy of types of organization
- Structure and connectivity
- Using data to create an organization
- Using data to evaluate an existing organization

In the afternoon the group divided into three subgroups and attempted to apply the principles uncovered in the morning to designing a fictional web site. Each group had a different section of a residential community web site to design based on information that was provided: content, user tasks, and community/primary user profile. The design needed to consist only of the organization of topics on the first page for the section and on the next page under each first page topic.

After determining a topic organization, the subgroup collected feedback from "a user" (a person from another subgroup) to evaluate the effectiveness of the organization. Each subgroup then presented its design to everyone and discussed how the design came about and how effective it was.

Major Types of Organization Schemes

The first of the four topics discussed in the morning was types of organization schemes or how should information be grouped at the top levels. We considered three types of organization, ones with which we were more familiar: task, topic content, and types of users. When a site is organized by task, visitors select an action first, e.g., buy or sell. Organizing by task may be most beneficial when visitors need to accomplish tasks quickly, without considering options along the way.

When a site is organized by topic content, visitors choose a topic first and then determine what to do with it. Organizing by topic content may work best when designers want to encourage users to spend time browsing in a relatively undirected way. Sites whose purpose is to entertain or educate by presenting multiple options are examples.

When a site is organized by types of users, visitors identify themselves as being from a particular user group. Organizing in this way seems to work best when boundaries between the user groups are exceptionally clear. Otherwise, users

may feel that they may miss important information by "pigeon-holing" themselves. Sites for colleges and universities, for example, have distinct groups of users: students, parents, and faculty.

Structure and Connectivity

The second topic we discussed was structure and connectivity of a site as a whole. Is it better to provide visitors with alternate ways of finding content or to try to guide them by only providing one way? We considered the advantages and disadvantages of several techniques: single versus multiple hierarchies and extensive versus limited cross-referencing. We concluded that:

- It may be more difficult for users to develop a mental model of sites with complex structures, e.g., multiple hierarchies, extensive cross-referencing.
- Having an accurate mental model may matter less when visitors come to the site infrequently and when visitors need to do tasks quickly in a directed way.
- Cross-referencing links may distract visitors when they are integrated into the content, as opposed to appearing underneath or alongside the content.

Using Data to Create an Initial Organization

This topic and the next one explored methods, analyses and techniques that participants have used to gather data from users to inform the design of web site hierarchies. The discussion involved sharing a technique, describing the satisfaction with the results obtained and the effort involved, and sharing any pitfalls or tips.

We discussed two case studies for using data to create an initial organization. Both used variations on card sorting techniques. One case study concerned a site that provides information needed to buy a home. Using a set of 50 cards with a task printed on them, participants were asked to sort the cards in several ways: by relative importance, by the order in which they would perform the tasks, and by affinity (i.e., which tasks "go together"). One of the lessons learned was that this technique is sensitive to the way the tasks are worded. For example, if a series of tasks begin with the word "Read...", participants tend to group tasks beginning with the same word together. To address this, tasks should be worded using synonyms and expressed in various ways.

The other case study was an intranet presenting administrative and technical information. Working individually, participants were given 85 sample documents and asked to design their own hierarchy from the bottom-up. Using the GroupSystems product, users grouped the sample items into 8-12 categories then grouped those categories into 4 high-level categories then finally into 2 highest level categories. The results were analyzed by visually inspecting the categories to identify the correspondence of participants' categories with categories generated by the design team. Since the design team found a wide variation among participants, in

many instances the participants did not provide clear guidance to the design team.

Using Data to Evaluate an Existing Organization

One case study used paper mockups to test four design alternatives. Users were given tasks to find various pieces of information. As users "clicked" on the pages, the experimenter displayed the appropriate destination page simulating the browser behavior. The measures collected included number of unsuccessful selections made, number of times participants give up, times top level visited, preferred design option, and comments.

Another case study used the NIST WebVIP tool to instrument a test site. Users were given 10 representative information search tasks. From the text file containing data about traversed links, the usability engineer could identify time on task, time on particular pages, use of the back button, links followed from pages, and the user path taken for the specified task.

One of the issues debated was setting benchmarks. For example, if a usability report states that "72% of the time, users select the correct category," would this be considered a good result or poor one or somewhere in between? Many workshop participants felt a blanket benchmark could not be set because of variation among evaluation techniques and site goals. In other words, 72% correct might be a great result in one context but a poor one in another.

Several participants shared their experiences with analyzing server log data.

- Huge amounts of data can be obtained with little or no effort. However, participants were generally unsatisfied with their ability to extract usable/actionable information, even with add-on data collection tools.
- Some of the data available include page access counts, keywords used in keyword searches, mean paths, and entry/exit pages.
- One use of server data was in before/after studies, e.g., to detect changes in usage profile after a design change.
- When the data included keywords users input in searches, insights into category label design are possible.

Design Exercise

The exercise gave the participants (randomly divided into three groups) the opportunity to try out organizing the first two levels of a fictional web site, a part of a large site for a residential community. Each group had one of the following categories of content: Health, School, or Entertainment. Each category had 26 examples of content in the form of headings, one per index card, e.g., medical clinics, school sports, message board, and concert schedules and locations. Each group was also given some information about the community, the primary users of the content, and some sample tasks those users need to be able to do. The participants could add additional types of content, additional tasks, etc.

The Health group considered both a task-oriented and a topic-oriented organization and decided on the latter. They grouped similar topics together by using both words, e.g., counseling and assistance. The School group organized by school name and made calendars prominent. The Entertainment group combined both topic-oriented and task-oriented approaches with the latter organized into time based, media based, and function based tasks. The Health and School groups used cross-referencing but cautioned that users can make inaccurate assumptions about them because of the page on which they appear. The groups varied in how they gathered feedback from a prospective user. One asked the user to do tasks of finding certain information by using a paper prototype. Another asked the user "What do you think you will find here?" and pointed to a selection in a paper representation of the top level of the site.

Most participants indicated that although the discussions had been worthwhile, they wished that there had been more time for in-depth discussion and for exploring the applications of our principles within the design exercise. Nevertheless, participants felt that the workshop had provided a space in which at least to begin discussions on a number of important and interesting design issues.

References

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About the Authors

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Paul McInerney has worked for over a decade as a user-computer interaction specialist and holds a graduate degree in human factors. He has a wide variety of experience, having worked at firms such as IBM, BNR (now Nortel), Atomic Energy of Canada, and Behavioural Team Inc, a consulting firm. His experience covers all facets of UCD including user requirements, UI design, design evaluation, UCD project planning and methodology.

Sharon Smith has fifteen years experience in user centered design of computer software. As a Usability Engineer in the Usability Expertise Center at Compaq Computer Corpora-

tion, formerly Digital Equipment Corporation, she has applied her skills in many areas from user needs assessment to usability testing. Her doctoral research includes empirical studies in animal communication at the University of Pennsylvania.

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