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The design of web sites with quality user interface

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Abstract

Usability engineering focuses on how well Web sites are structured. Many designers are unaware of the diversity of usability engineering and what it can offer the developer in efforts to produce a usable Web site. Three researchers in the field, Borges, Morales, and Rodriquez (1998), have created a style guide of content, which recommends essentials for user-friendly Web sites. They included in their list Common Look and Feel (CL&F), Information Display, Navigation, and Labels. This research paper goes through the steps it took to create a quality Web site using the style guides of the noted researchers.

THE DESIGN OF WEB SITES WITH QUALITY USER INTERFACE

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Introduction

Web sites have become an intrical part of modern communication and advertising unfortunately many sites lack quality user interfaces, which can have a number of negative affects on the user, the designer, and the owner(s) of the site. Every year it seems the World Wide Web (WWW) doubles in size with sites being added daily. There are several reasons for such an explosive growth of information sites on the WWW. There is the ease of publishing; relatively low cost of having a Web presence; low training needs because of the simple, link-based navigational model; ease in updating and distributing information; platform independence; and the potential of reaching a wide audience (Vora, 1998). Such seductive benefits of the WWW have led to an unprecedented rush to have a Web presence, but many Web sites fail to realize their potential because they disregard users' needs and requirements (Sano, 1996). The proliferation of pages with poor usability suggest that most designers of Web pages have little knowledge of user interface (UI) design and usability engineering. This serious problem was addressed during the process of preparing the

Division of Educational Technology's Program Accreditation Web site that was designed by this researcher (see Appendix). The paper also focuses on the specific needs of the users of this Web site.

Pages with poor usability can have negative effects. Users can become frustrated, because of an inability to find the information sought. Exploration is discouraged because of barriers imposed by the poorly designed interface and users' lose trust or faith in the site (Borges, Morlales, & Rodriguez, 1998). Time is wasted, because of disorganized pages, misleading link names, long pages, and long download times. Internet traffic has increased. The obstacles just mentioned not only affect the user of the particular site, but are also responsible for much unnecessary traffic on the Internet (Borges, Morlales, & Rodriguez, 1998). From all points of view, it is important to apply practical methods for designing usable Web pages. The Program Accreditation Web site that the researcher has created took these factors into consideration to provide the viewer with a quality user interface design.

There are many reasons why an individual or organization might decide to publish a Web site. There

may be an attempt to attract business or to offer a service. In the case of the Web site that was created, the purpose was to provide viewers with information to support the University of Northern Iowa's application for accreditation of its two Masters programs in Educational Technology.

Usability engineering focuses on how well Web sites are structured. Many designers are unaware of the diversity of usability engineering and what it can offer the developer in efforts to produce a usable Web site. Three researchers in the field, Borges, Morales, and Rodriquez (1998), created a style guide of content, which recommends essentials for user-friendly Web sites. They included in their list Common Look and Feel (CL&F), Information Display, Navigation, and Labels. This research paper goes through the steps it took to create a quality Web site using the style guides of the noted researchers.

The researcher did an extensive search of information to find sources that agree with the approaches used in this project. The researcher intended to find experts who supported and were against the concept of creating guidelines for Web developers to follow. In searching for information,

none were found who were completely against the concept. The researcher used credible sources for literature related to the topic of the project from the University of Northern Iowa's Rod Library and the Internet. If information found from the various resources discussed criteria for the design of user-friendly Web sites, then the resource was chosen to be used for the design of this project.

Methodology

Planning

The researcher had to go through a planning stage before attempting to physically design the site. In this planning stage, the most important question was: "Why design a Web site?" (Vora, 1998). Unless this question was answered satisfactorily, plans to create a Web site would not have proceeded. After discussing the goals of the site with the members of the Educational Technology Division, the next step was to understand the users and the users' environment. This understanding helped define the boundaries for the Web site design. Finally, it was important to identify the needs and requirements of the content owners.

Identifying and establishing the goals of the Web site makes it easier to plan the overall organization

and presentation of the site's information (Heller & Rivers, 1996). Without a clear purpose for a Web site, development very likely proceeds haphazardly, in a manner that Blundon (2001) refers to as "a process of random mutation" (p.19).

When planning to create the Educational Technology Program's Accreditation web site, the researcher met with the members of the division to discuss the needs of the site and the site users. The purpose of the site is to showcase the program's standards. These standards define the requirements for accreditation approval and will be available to the public through the current College of Education's home page. A site map was created to give the researcher a visual representation of how the site would be laid out and to determine what structure best provides quality user interface.

In designing Intranets (or internal Web sites), a major goal may be to facilitate better communication and access to information for all employees in an organization (Sano, 1996). On the other hand, for online services the purpose of the Web site could be to get people engaged. The design would then be based

on encouraging repeated use (Barrett, Levinson, & Lisanti, 2001).

Once the goals of a Web site are established, the next step is to understand and capture user needs, characteristics of the use of the content, and user environments. The way that a Web site is designed often depends on whether it is for external or internal users (Forsythe, Grose, & Ratner, 1996). For an external audience, a wide variety of client software, hardware, and network connections need to be accommodated. An internal audience allows the designer a better understanding of hardware and software requirements.

At the planning stage, the focus should not be exclusively on the users of information. Before beginning to design, developers must identify content owners and authors and involve them in the process of Web development (Vora, 1998). This process is necessary because the authors and owners are partially responsible for ensuring ongoing usability of a Web site after its activation. Many problems related to ownership and responsibility can be avoided at the maintenance stage when these issues are addressed in the planning phase. Also, it may be useful to get

university or even corporate public relations involved to make sure that the Web site conveys an appropriate message branding or corporate image. When these considerations are overlooked, Web sites may have very short life spans (Vora, 1998). After discussing site requirements with the members of the division, the researcher presented a first draft to the division for approval in compliance with the planning procedure.

Analysis

One must go through an analysis stage when designing a Web site. The researcher had to make decisions about both content and process. Content-related issues refer to the structuring of information, the information at different levels of the structure, and the overall content navigation strategy. The researcher designed a site map to visually organize the layout of the site. Process-related issues refer to how the content is organized and how the interactive aspects of Web sites are handled behind the scenes so that they are transparent to users. The analysis stage can be divided into two distinct sub stages: content analysis and process analysis.

The content analysis requires identifying user tasks, understanding the information needs of potential users, and analyzing the content to be put on the Web. It is important to define and analyze the content before spending a lot of time and effort in page design. A designer often invests considerable time and effort in page layout and navigation design only to find later that the design does not work for the content or purpose of the site (Vora, 1998). The process layout deals with making the site interactive, especially to promote two-way communication. If a Web site is designed for interactivity, it is necessary to analyze the process or processes that support the interactivity. In this case, the Web site is more of an informative site. The only type of interactivity on the site would be contact information in which a link to e-mail the division is provided.

Design & Development

In the design and development stage, information gathered during planning is translated into actual design. Before beginning to design, the researcher had to become knowledgeable about Web editors and technologies such as Hypertext Markup Language (HTML), graphic compression schemes (GIF or JPEG), and

advanced Web tools. The researcher had to learn how they work and had to understand their continually changing potential and limitations. Designers need to understand the way graphics and multimedia work on the Web (Sano, 1996). Designers must ensure that Web pages display well on a variety of computers with different color palettes and must take into account users' differences in the network connection speeds (Wilson, 1995). The researcher felt comfortable using Microsoft FrontPage as the Web editor.

As with hypertext, the major problem facing Web designers is managing complexity; how not to overwhelm users with a vast amount of information. Understanding how Web users behave can be very useful in designing comprehensive and easy to use Web sites.

There are an abundance of design guidelines on the Web but with changing technology these guidelines need revisions and designers must be informed about changes so that they may be able to implement better design solutions (Barrett, Levinson, and Lisanti, 2001). To address this problem, Borges, Morales, and Rodriquez, (1998) identified ten fundamentals regarding Web user's behaviors and preferences that are likely to remain unchanged, despite changes in Web technology.

Their guidelines for designing useable Web pages state:

1.) (Avoid Headers should not take more than 25% of the letter-size page.

2.) Headers and footers should be clearly separated from the body of the page. (One way of achieving this is by placing bold lines or horizontal rules between them and the body.)

3.) Names of links should be concise and provide a hint of the content of the page they link to. (Avoid using technical words.)

4.) Avoid adding explanatory comments to textual links.

5.) Avoid linking mania (meaning making a link every time a keyword of page is mentioned in a text).

6.) Verify that links connect to existing pages.

7.) Linking icons should have a distinctive feature of the page they link to.

8.) Maintain consistency when using icons. The same icon should be used for the same purpose.

9.) Colors should be selected so pages can be clearly displayed and reproduced on black and white displays and printers.

10.) It is desirable to include the date the page was last modified, the mail address of the person who maintains the page, and the Uniform Resource Locator (URL) address of the page on a footer. (p.141)

Selection of Technologies and Web Editors

Designers have to take into consideration what type of software technology they will use to create their site. Designers must balance the use of advanced technology against users' needs to access the information and against constraints imposed by users' existing hardware and software (Vora, 1998). When Web designers use sophisticated technologies, they must decide whether a larger number of viewers will be able to take advantage of them. For this project, the researcher used software (Microsoft FrontPage) he felt comfortable with and one that was compatible with most, if not all, Web browsers. Even when feasible, advanced technology should be used only if it considerably improves usability and offers a richer

experience to users. From the information gathered during the planing stage about the users' environment, the use of advanced technology was determined to be feasible.

Evaluation and Usability Testing

Testing a Web site at various stages of design and development is key to meeting the objectives of the site and to designing one that is effective. The nature of testing is dependent on how far the design has proceeded.

An easy way to conduct a usability test is to give users a set of tasks to perform using a Web site prototype before it is uploaded to a server for viewing. A search task can be extremely helpful. It is important to observe and take notes as they complete the task (Nielson & Sano, 1995; Vora, 1996). Users may also be asked to think aloud or verbalize their actions and thoughts as they go along, so that their experiences can be captured. To capture quantitative data, it may be necessary to record their navigation in the background along with time stamps to determine the amount of time it takes a user to find the desired information. Users may be debriefed about their experience and asked to fill out a questionnaire to

capture their experience and suggestions for improvement. Usability testing or evaluation of Web sites should focus on at least three components: content, navigation, and presentation.

Implementation

This step is probably the easiest in Web site development. In this stage, the content whether developed locally or in a distributed manner is moved to the Web server (Vora, 1998). Final testing of links and common interface programs are implemented to ensure that links and all the common interface programs work as expected. Forsythe, Grose, and Ratner (1998) state "for reasonably sized Web sites, it helps to take advantage of Web site management software so that broken links can be easily identified" (p.167). Several current versions of site management software and Web servers offer such functionality.

Maintenance

Maintenance is a critical factor in having a successful Web presence. Maintenance is easier said than done (Vora, 1998). The challenge is to provide ever-changing, useful content while maintaining the integrity of the Web site. Maintenance also requires that the trends in Web site utilization are analyzed

and changes are made to accommodate users' needs. Finally, to keep the Web site interesting and useful, Web site managers must periodically identify, evaluate, and incorporate new technologies, as they become feasible. This researcher's site is nearly finished and it has been saved and properly named on a server so that future site managers can easily edit the site (http://ci.ceo.uni.edu/edtech/ecit/index.html) as of December 21, 2001.

Conclusions and Recommendations

The researcher has gained insight on the importance of the organization of information for public use and steps to create Web sites that focus on quality user interface. Working on this project has also given him an understanding of how Web editors work, how servers operate, and guidelines that should be followed when designing Web sites. These guidelines are expressed in simple terms so that any Web designer can apply them. They are helpful to most page designers because they allow them to design usable Web pages without spending too much time reading literature about page design. The guidelines take only a few minutes to understand and are useful

for conducting heuristic evaluations of existing pages to detect usability problems.

As technology evolves, new elements will be integrated in the design of Web sites. This process will require a continual review of site design guidelines. The researcher's application of the identified guidelines can assist future Web designers apply the principles of human-computer interaction and usability engineering in their own designs.

References

Barrett, E., Levinson, D.A., & Lisanti, S. (2001). *The MIT guide to teaching Web site design*. Cambridge, MA: The MIT Press.

Blundon, W. (2001). *So you want to build and internet?* JavaWorld. Available: October 12, 2001 http: //javaworld.com/javaworld/jw-12-1996/jw-12blundon.html

Borges, J., Morales, I., & Rodriguez, N. (1998). *Page design guidelines developed through usability testing.* Mahwah, NJ: Lawrence Erlbaum Associate Publishers Inc.

Forsythe, C., Grose, E., & Ratner, J. (1998). *Human factors and Web development*. Mahwah, NJ:Lawrence Erlbaum Associate Publishers Inc.

Heller, H., & Rivers, D. (1996). So you wanna design for the Web. *Interactions*, 3(2), 19-23.

Nielsen, J., & Sano, D. (1995). *Sun Web: User interface design for Sun Microsystems internet. Available: O October 14, 2001 Web*.http://www.sun.com/technology-research/sun.design/sunweb.html

Sano, D. (1996). *Designing large -scale websites: A visual design methodology*. New York: Wiley.

Vora, P. (1998). *Human factors methodology for designing Web sites*. Mahwah, NJ: Lawrence Erlbaum Associate Publishers Inc.

Wilson, S. (1995). *WorldWideWeb design guide: Learn to design professional Web pages*. Indianapolis, IN: H Hayden Publication.

Appendix

The University of Northern Iowa

Division of Educational Technology's Program Accreditation

Educational Technology Accreditation

(Insert Overview of Program)

- **Conceptual Framework**
- **Standards**
- **College of Education**

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