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Applying Web Design Guidelines: How to Improve the Usability of Government Web Sites

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APPLYING WEB DESIGN GUIDELINES:

HOW TO IMPROVE THE USABILITY OF GOVERNMENT WEB SITES

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Abstract

The paper discusses the first phase in a research program that aims at forming a set of user-centered web design and usability guidelines that can be used to improve the usability of government web sites. This initial research will use the American National Standards Institute's ANSI INCITS 354-2001 Common Industry Format for Usability Test Reports (formerly ANSI NCITS 354-2001) standard in its research framework, and similarly, the research will focus on three usability metrics (effectiveness, efficiency, and satisfaction) defined by that ANSI INCITS standard. As the preliminary goal, this research will form a set of web design and usability guidelines by using usability.gov as the major resource. In the following stage, the research will perform summative usability testing on the web site of the North Dakota Parks and Recreation Department (www.ndparks.com) to examine the effects of these determined web design and usability guidelines. As a result of analyzing the data collected through the summative usability testing, the research will determine which of the formed web design and usability guidelines have effective potential roles on users to achieve certain goals.

Keywords: Common Industry Format (CIF) for Usability Test Reports, ANSI standards, ISO standards, e-government, usability of government web sites, summative usability tests, web design guidelines, usability guidelines

Introduction

The Council for Excellence in Government (2001) points out that the ideas of a more knowledgeable citizenry and a government more accountable to the people have become central to U.S. citizens' current vision of e-government. Clearly, this kind of vision involves more than just superior e-government services.

According to Larsen & Rainie (2002), the use of government web sites has been one of the most rapidly increasing user activities in the United States. Because of this, it is critical while developing and implementing new government web sites (or restructuring and improving existing ones) to understand clearly citizens' expectations for them.

This research will conduct summative usability testing on a selected set of U.S. government web sites. A current International Organization for Standardization (ISO) standard, 9241-11:1998, defines usability as the "extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (p. 2). The American National Standards Institute (ANSI) (2001) describes a summative usability test as "a usability test of a

completed product to determine how well it meets its usability objectives" (p. 21). This research will use the following standard to establish a common research framework:

- ANSI INCITS 354-2001 *Common Industry Format for Usability Test Reports* (formerly ANSI NCITS 354-2001)

Research Objectives

Using the above definition of usability, the purpose of this research is to employ a systematical assessment approach to determine how the application of user-centered web design and usability guidelines to government web site design affects users in accomplishing their particular goals with effectiveness, efficiency, and satisfaction. The research will focus on these three usability metrics, which the Common Industry Format (CIF) for Usability Test Reports defines as follows (American National Standards Institute, 2001):

> Effectiveness: The accuracy and completeness with which users achieve specified goals.
>
> Efficiency: The resources expended in relation to the accuracy and completeness with which users achieve goals.
>
> Satisfaction: Freedom from discomfort and positive attitudes towards the use of the product. (p. 3)

This research is the first phase in a research program that will have the following goals:

- Determine a set of web design and usability guidelines suitable for developing user-centered government web sites.
- Conduct summative usability testing in order to analyze the effects of the selected web design and usability guidelines on use of government web sites.
- Determine which guidelines make a difference in supporting users to accomplish specific tasks.
- Form a group of guidelines that have significant effects on facilitating user activities.

This research program aims at introducing a set of task-oriented design and usability guidelines that can be used for developing user-centered government web sites. It is expected that the introduced set of guidelines will significantly facilitate government efforts in fulfilling users' expectations and satisfying customers on the Internet.

Focus Area

Larsen and Rainie (2002) write that the search for tourism and recreational information is the most common government web site user activity, done by 77% of the people who visit government web sites (p. 3). Therefore, this research focuses on government web sites that provide access to such popular information. The web site of the North Dakota Parks and Recreation Department (www.ndparks.com) has been selected as the sample U.S. government web site for this research. This particular web site was chosen after various analyses of each department or agency that provides parks and recreation information services in the United States. The selection process also involved a series of phone interviews with the web masters responsible for the web sites of some of these departments or agencies.

This focus web site is in the interactive stage of its content and e-government services. This stage is one of the five stages of e-government, as determined by the American Society for Public Administration (ASPA) and the United Nations Division for Public Economics and Public Administration (UNDPEPA) (2001), and these five stages are defined as follows:

1. Emerging: A government web presence is established through a few independent official sites. Information is limited, basic and static.
2. Enhanced: Content and information is updated with greater regularity.
3. Interactive: Users can download forms, contact officials, and make appointments and requests.
4. Transactional: Users can actually pay for services or conduct financial transactions online.
5. Seamless: Total integration of e-functions and services across administrative and departmental boundaries. (p. 2)

Research Approach

Participants

The Performance Institute (PI) (2002) classifies Internet users who interact with government agencies can be classified in the following three major segments:

1. Government to Citizen (G2C): Individuals accessing services or information
2. Government to Business (G2B): Organizations accessing services or information
3. Government to Government (G2G): Partner government agencies accessing services or information—or integrating services across agency organizational boundaries through technologies. (p. 14)

This study will focus on the users who are in the G2C category. Consequently, a set of participants has been selected among graduate students studying in various fields at the Claremont Graduate University. In the selection process, the diversity in graduate students' personal and professional backgrounds, interests, and cultural differences has been taken into consideration in order to form a group of Internet users that could represent a larger population.

Research Design

Prior to the usability test, the related content of the focus web sites will be downloaded by using an appropriate third-party application. As a result, it will be possible to have the site frozen in time during the entire period of the evaluation. This will keep the content of that web site from being changed or even removed suddenly by its web master(s) at any stage of the test. A team of web designers will redesign the downloaded web site according to a predetermined set of user-centered web design and usability guidelines. Then, a group of web design experts will evaluate the degree to which the redesigned web site complies with the predetermined reference guidelines.

The major resource for this research in determining these guidelines is Usability.gov, which is provided by the Communication Technologies Branch (CTB) of the National Cancer Institute's (NCI's) Office of Communications (National Cancer Institute, 2002, Who manages this site? section, para. 1). NCI (2002) designed Usability.gov "to provide current and accurate information on how to make health-related information Web sites and other user interfaces more usable, accessible, and useful" (What's the purpose of this site? section, para. 1). The site has made its research-based web design and usability guidelines available for use in developing web sites on other fields.

The original and the redesigned versions of the focus U.S. government web site are going to be used in this research; therefore, the participants will be asked to evaluate both of them during the usability testing phase.

The summative usability test of this research has an experimental design. In order to measure the two major usability metrics (efficiency and effectiveness), participants will try to perform a series of key tasks that typical users might want to achieve while conducting a specific government web site user activity. Task analyses conducted in the design stage of the summative usability test will determine these tasks. Participants will fill out a standardized questionnaire after completing the tasks. The results of the questionnaire will be used to evaluate the third usability metric (satisfaction).

Data Analysis

The collected user data from the usability test will be analyzed with statistics appropriate for task and survey analyses.

Reporting Research Outcomes

The Common Industry Format (CIF) for Usability Test Reports will be used so that the collected user data from the summative usability test will be organized and presented in a standardized format. The U.S. National Institute of Standards and Technology (NIST) (n.d.) developed this common usability report format, which ANSI also approved as an ANSI standard called ANSI INCITS 354-2001 (formerly ANSI NCITS 354-2001).

Research Implications

This research will promote improved understanding, analysis, and comparison of the effects on citizen usage of government web sites designed according to specific web design and usability guidelines with other web sites having designs that are not consistent with such guidelines. It will examine the ability of users to achieve certain goals on different sites in terms of effectiveness, efficiency, and satisfaction. What will be learned from this research will make it possible to determine which components of the guidelines are most critical for users' performance and satisfaction. Having such knowledge about guideline components will help to set implementation priorities in government web site development projects.

This approach can be useful for projects having limited implementation time and budget. It can also help developers to create citizen-centered government web sites that are designed to satisfy customers and fulfill their expectations. The results of this research may contribute to the emergence of standard approaches for improving citizen-centered public services on the Internet. In addition, ANSI (2001) indicates that the use of the CIF report format will provide sufficient detail about how usability testing was performed here to facilitate replication (p. 5).

References

American National Standards Institute. (2001). ANSI INCITS 354-2001 Common Industry Format for Usability Test Reports (formerly ANSI NCITS 354-2001). Washington, DC: American National Standards Institute (ANSI).

American Society for Public Administration, & United Nations Division for Public Economics and Public Administration. (2001). Benchmarking E-government: A Global Perspective --- Assessing the Progress of the UN Member States. Retrieved October 08, 2003, from http://unpan1.un.org/intradoc/groups/public/documents/un/unpan003984.pdf

The Council for Excellence in Government. (2001). E-Government: The Next American Revolution. Retrieved October 07, 2003, from http://excelgov.org/usermedia/images/uploads/PDFs/bpnt4c.pdf

International Organization for Standardization . (1998). ISO 9241-11:1998 Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) -- Part 11: Guidance on Usability. Geneva: International Organization for Standardization (ISO).

Larsen, E., & Rainie, L. (2002). The Rise of the E-Citizen: How People Use Government Agencies' Web Sites. Retrieved October 06, 2002, from http://www.pewinternet.org/reports/pdfs/PIP_Govt_Website_Rpt.pdf

National Cancer Institute. (2002, August 05). Usability.gov: About This Site. Retrieved October 07, 2003, from http://www.usability.gov/about.html

National Institute of Standards and Technology. (n.d.). Main IUSR (Industry Usability Reporting) Site. Retrieved October 05, 2003, from http://zing.ncsl.nist.gov/iusr/

Performance Institute. (2002, October 30). Creating a Performance-Based Electronic Government. Retrieved October 08, 2003, from http://www.performanceweb.org/research/egovernmentreport.pdf