5-20-2011

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ABSTRACT

The Human-Computer Interaction (HCI) discipline is concerned with design, evaluation and implementation of interactive computing systems for human use. HCI and System Usability Design have greater significance in electronic government (e-government) as the usability problems can adversely affect millions of people. The goal of the study is to examine the extent of "Interactive Web Applications" in India, USA, Finland and China. In addition to measuring the number of websites and web portals, the study will determine if the design of those "Interactive Web-applications" base sites are effective from the HCI and system usability perspective. The present study will enhance ongoing research on the subject.

Key Words: E-government, human-computer interaction (HCI), usability, accessibility, interactive web application

INTRODUCTION

Over the years, e-government web sites have changed from yesterday's static Web to the new dynamic and interactive Web applications. The demands for e-government "Interactive Web applications" have been continuously increasing. As government organizations have begun to enhance transparency, communication and interactions with citizens and businesses through e-government offerings, developing "Interactive Web applications" has become an imperative for e-government. The "Interactive Web applications" will increase citizen participation and awareness by making it easy to obtain up-to-date maps and reports of services, facilities, and statistics and will empower citizens and businesses for true e-democracy. Human factors and system usability are the ignored imperatives in most e-government projects. As per the World Bank report, approximately 35% of e-governance projects in developing countries are total failures; approximately 50% are partial failures and only 15% can be seen as full successes. Many of the failures are attributed to bad interface design (http://www.ifg.cc/index.php?option=com_content&task=view&id=7293&Itemid=92)

The Human-Computer Interaction (HCI) discipline is concerned with the design, evaluation and implementation of interactive computing systems for human use; and with the study of human dimensions and the surrounding phenomena. The primary objective of HCI is to enhance the usability of systems (Zhang, and Galletta, 2006). Usability is a term used to denote the ease with which people can employ a particular product to achieve a particular goal. It is an approach to system design in which levels of usability are specified quantitatively in advance, and the system is engineered towards these measures. HCI and System Usability Design have greater significance in electronic government as the usability problems can adversely affect millions of people (Rogers, 2004).

The goal of the study is to examine the extent of "Interactive Web Applications" in India, USA, Finland and China. In addition to measuring the number of websites and web portals, the study will determine if the design of those "Interactive Web-applications" base sites are effective from the HCI and system usability perspective. Users expect highly effective and easy-to-learn interfaces and developers and designers now realize the crucial role of user interface (Bannon, 2005). Various studies indicate that over 50 percent of the design and programming effort on projects is devoted to the user interface portion (Barnard et al., 2000; Hollan et al., 2000). The general community has accepted websites for communication with various government agencies and other constituents. Research reviewing related web sites reveals various accessibility and usability problems. It would be beneficial for practitioners, researchers and website designers to have a genuine set of

guidelines that address both usability and accessibility issues. This would enable the design of truly usable and accessible websites that eventually achieve the 'design for all' goal. The present study may have several implications for those designing websites and those standards of accessibility and usability. This would also provide opportunities for further research in information systems, computer science, and cognitive and social psychology.

LITERATURE REVIEW

Human-Computer Interaction (HCI) is gaining momentum as computing technology increasingly impacts individuals, businesses, society, commerce and government throughout the world. HCI research has evolved over the past few years from focusing on technical (ergonomic) aspects, to conceptual (information-processing) models, to work-process (contextual) models (Dix, et al., 2004, Zhang et al., 2002). Several theories exist relating different models of users, designers and systems (Olson and Olson, 2003, Zhang, and Dillon, 2003). Researchers proposed four basic models of models that affect the way users interact with a system which are *User's model of the system* which is the model constructed at the users' side through their interaction with the target system, the *system's model of the user* which is the model constructed inside the system as it runs through different sources of information such as profiles, user settings, logs, and even errors. The third model is the *conceptual model* which is an accurate and consistent representation of the target system held by the designer or an expert user, and the last model is *the designer's model of the user's model* which is basically constructed before the system exists by looking at similar systems or prototype or by cognitive models or task analysis.

HCI is less focused on technology per se, than on the usage of information technology. Its objectives include understanding the psychological and behavioral interaction between user and computer systems, machines, devices and other kinds of complex electronic artifacts. It involves development and design of new technology, but this is always tied to extensive evaluation studies with actual users: (ACM, SIGCHI, 1992 cited in Preece (1994:7). The basic assumption here is that users are different and situations of usage change. An interface, function, information display or structure may work in one situation but not in others. Instead of having the user adapt according to the technology, the interface should, according to this line of research, adapt to the user's need at the moment in an automatic and 'intelligent' way (so called adaptive interfaces). In order to do so, there has to be some sort of model of the particular user, informed by either active and explicit preferences settings of the user, or some sort of automatic user-modeling on the basis of the actions and behavior of the user in the system (Shneiderman, and Plaisant, 2004,).

METHODOLOGY

Ethnographic methods are an established tool for requirements analysis in Human Computer Interaction (HCI) and Computer Supported Collaborative Work (CSCW) (Anderson, 1994). The main research question of this study is; how do the selected e-government websites fare as per usability and accessibility standards?

This study will use four different available user interface evaluation methods such as task analysis, cognitive walkthrough, features inspection and heuristic evaluation for the study. Twenty to thirty (20-30) e-government websites will be chosen to be assessed and evaluated for their accessibility and usability design principles. The study will also use 40-50 users to evaluate these web sites using the above mentioned user interface evaluation methods. A questionnaire to collect data has been developed. To answer the research questions, the means and standard deviations of the accessibility and usability ratings of the 20 selected websites will be calculated. The study will use a two phase approach for the usability study. In the first phase, 20-30 web sites will be identified. We will also identify representative tasks and users to assist in the usability evaluation. In the second phase, we will be using a combination of expert analysis, usability metrics and representative user testing. As part of expert analysis we will use heuristic evaluations and cognitive walkthroughs. As part of heuristic evaluations we will be requesting a few usability professionals to evaluate the environment for compliance to standard design and usability heuristics. As part of cognitive walkthroughs we will be requesting the same usability professionals to test the environment using typical scenarios designed around expected user behavior (Tang, Z., et al., 2006, Despont-Gros, et al.,2005).

Through a questionnaire survey we will be collecting user demographics, previous experience, and attitude. As part of representative user testing, we will be conducting formal empirical observations through which we can observe individual users complete specific tasks as they interact with the environment. We will also be combining this with the "Think-aloud" approach in which individual users provide a running commentary on their thoughts as they perform particular tasks. The data will be collected using all these methods. After data is analyzed, a new set of guidelines will be developed for usability and accessibility assessment. The ethnography approach would enable us to "see through the user's eyes and be in their

shoes". In order to get qualitative information, interviews and field observations will be conducted, which are both prevailing methods in the field of interaction design. Participant mix will be a mix of men and women, with a minimum of at least 3 years experience of using a graphical user interface (GUI) and web. Each participant can be considered more as a user of the system and not as a developer. Participant selection will be based on different type of users such as government employees, business professionals, students, retired people, homemakers, and teachers.

The data collection stage is in process. The contacts have already been made with some potential participants. A random sample of current web sites from government and city municipal organizations are selected. Participants will be asked to look for various services, and will also be asked questions about what they liked and disliked about completing the scenario. Data regarding the reflecting participants' satisfaction with the tasks will be gathered. This data will be used to understand and interpret the participants' thoughts. Each session will be set up with participating users for 10-15 minutes. We will also be videotaping and recording participants' comments and behaviors, and to record scenario.

DATA ANALYSIS AND FINDINGS
Currently, the study is in data collection stage. The results of the study would be presented in the conference.

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