Zaphiris, P. (chair), Noiwan, J., Kurniawan, S.H., Karoulis, A. (2001). Panel on Special Topics of Web Usability. In WebNet 2001: World Conference on the WWW and Internet, Orlando, USA, 23-27 Oct.

Panel on Special Topics of Web Usability

Panayiotis Zaphiris
Institute of Gerontology and
Wayne State University
Detroit, MI
p.zaphiris@wayne.edu

Jantawan Noiwan
Information Systems Department
University of Maryland Baltimore County
Baltimore, MD
noiwan@umbc.edu

Sri H. Kurniawan
Institute of Gerontology and
Wayne State University
Detroit, MI
s.kurniawan@wayne.edu

Athanasios Karoulis
Department of Informatics
Aristotle University
Thessaloniki, Greece
karoulis@csd.auth.gr

Abstract: Special web usability issues, like senior-centered design and cultural considerations when providing information on the web, are getting more and more attention from the design and academic community. Furthermore, new applications (especially e-learning) are gaining more and more popularity and create new opportunities but also new challenges for the design community. The objectives of this panel are: (1) To briefly introduce the general topic of web usability, (2) To present a selection of special issues related to the general topic of web usability (3) To become a forum for open discussion on these topics among the WebNet community.

1. Position of Panayiotis Zaphiris (Web Usability)

Usability of a product or system – whether a web site, software application, mobile technology or any user-operated device can be defined as "a measure of the ease with which a system can be learned or used, its safety, effectiveness and efficiency, and attitude of its users towards it." (Preece et al., 1994)

In other words Usability is a combination of factors that affect the user's experience with the product or system, including (http://www.usability.gov) :

1. Ease of learning: How fast can a user who has never seen the user interface before learn it sufficiently well to accomplish basic tasks? Once an experienced user has learned to use the system, how fast can he or she accomplish tasks?
2. Memorability: If a user has used the system before, can he or she remember enough to use it effectively the next time or does the user have to start over again learning everything?
3. Error frequency and severity: How often do users make errors while using the system, how serious are these errors and how do users recover from these errors?
4. Subjective satisfaction: How much does the user like using the system?

Through out the years a series of methodologies have been developed for achieving a user-centered design that can achieve the design of usable, effective and efficient to use products. Also a series

of methods and tools have been developed to qualitatively and quantitatively measure the usability of these products and services.

Furthermore, these methodologies have recently been adopted or modified and applied to web usability studies. Focus groups, heuristics, log data analysis, questionnaires, formal usability tests have all been extensively adopted and used in usability evaluations of web sites.

But, although usability advocates (like Jackob Nielsen) believe that "usability rules the web" (Nielsen, 2000) studies typically find a usability success rate of less than 50%.

What needs to further be done? What new techniques and methods might be necessary to enhance the current usability testing methodologies? What about the non-traditional issues surrounding the web? Are cultural issues and issues of internationalization important when it comes to web design? What about seniors or people with disabilities that try to access information on the web? Is the web accessible to these groups of people? Are our e-learning methodologies and applications usable? What do we need to have in mind when we decide to move our course or training online?

2. Position by Jantawan Noiwan (The Impact of Culture in Designing Web-Based Systems)

The exponential growth of Web sites and Internet users could be considered as a significant phenomenon in information technology throughout the world. The Internet as the global communication channel allows buyers and sellers who have different cultural backgrounds and speak different languages to interact with each other. Therefore, undoubtedly, electronic commerce on the Internet significantly boosts profitability and productivity of worldwide companies. Accumulated survey data from plenty sources sheds light on possibilities of strong competition among e-commerce businesses to reach through the huge number of international Internet users.

The success of e-commerce could depend on the effectiveness of managing cultural differences of users from different parts of the world. Internationalization and localization are the two opposing concepts in applying cultural factors into interface design. Both internationalizing and localizing Web sites to customers in each particular culture have advantages and disadvantages; internationalizing or standardizing can reduce costs, but localizing can better serve the needs of customers in particular cultures, regions, or languages.

Culture has been differently defined across areas of study (e.g., anthropology, cognitive psychology, sociology, information technology management, and organizational management). Generally, culture differs not only in language, symbol, image, color, and format of date and time, but also emotion, personality, perception, cognition, and thinking style.

To localize an interface by taking cultural factors into account must be considered with care. Several HCI researchers are currently exploring many aspects of culture that can influence interface design. However, cultural studies in HCI are still very limited. Basically, general guidelines of cross-cultural interface design and general models of cultural differences might be adapted for interface design purposes, thereby improving in user performance and user satisfaction.

The panel attempts to discuss the efforts of HCI researchers in understanding cultural impacts in human information system. Developing successful computer interfaces, either for software or Web sites, require careful considerations on language translation and implications of culturally sensitive elements. Ignoring cultural issues, to make interfaces standard for all users around the world might not be a right solution. Rather, such interfaces should be designed to fit with intuitive usability in representational, cognitive, and attitudinal aspects of users in each particular culture, since users from different countries not only speak different languages, but also have different cultures that make them process information, think, feel and act differently.

Most of cultural issues in HCI are related to representations of interface elements such as colors, languages, icons, symbols and images. Environment and culture shape humans' perceptual practices. In recent years, most of the empirical studies with regard to the design of cross-cultural interface attempt to examine the question of whether cultural diversity affects visual perceptions. For instance, color connotations convey different meanings from culture to culture; red means happiness in China but means death in Egypt. Misinterpretation of the meanings of these culturally sensitive elements could reduce user performance and satisfaction. The results might be even worse with users who have an external locus of control. This characteristic is found in cultures that have high uncertainty-avoidance. Such users tend to believe that they cannot control the situation they face (e.g., computer operation) and tend to be fearful of doing things wrong.

Other than studies of culturally representational aspects in interface design, some culturally cognitive studies have been investigated such as menu interface design. Apparently, researchers and

practitioners could not deny that human cognitive processes vary across cultures. Most of studies in culturally cognitive aspects are comparatively conducted between Chinese and American subjects.

To measure how users perform and how they think about the system are equally important. Similar to user performance, user attitudes or judgments in experiencing the system are different across individuals, which affect how users use the system in the later time. Culture plays an important role in shaping and influencing how users think and feel toward a stimulus. HCI researchers points out that studies on feelings, values, tastes and beliefs that could influence human interaction with computer technologies should be investigated. A number of information system studies measure user attitudes toward computer technology in relationship to cultural diversity. In cultural interface design, however, very few empirical studies have been explored subjective interface evaluation. Most of such studies are related to interface aesthetics.

3. Position by Sri H. Kurniawan (Universal Usability: Improving Online Information Usability for Older People and People with Disabilities)

Previous studies showed that users have various problem in utilizing the information effectively when the user group is not represented in the design team, which is often the case with web information for older users and users with disabilities. The purpose of this panel is to view usability problems commonly faced by older users and users with disabilities and ways to improve the usability of online information usability for these users.

By the year 2030 people aged 65 and above will represent 20% of US population (U.S. Census Bureau, 2000). Older adults are also a rapidly growing segment of the online user population. Until recently, older adults have been underrepresented as Internet users, but the most generous recent estimates conclude that seniors represent 13% of online users (Cury, 2001).

The number of seniors online is expected to increase with the aging of the more computer-literate baby-boomer population. This significant increase in the older computer user population has led to various studies investigating the age effect in utilizing the Web. Some findings suggested that older adults have some disadvantages in fully utilizing the Internet as an information source. That is, older people have more trouble finding information in a Web site than younger people (Mead et al., 1997). However, little effort has been placed to ensure that online information is structured to help older computer users to find the desired information easily and efficiently.

With more and more information and services available for public over the Internet, it is imperative that no element of society be left out. The World Health Organization estimates that seven to ten percents of the world's population are disabled, either physically or cognitively (WHO, 1999). People with disabilities are supposed to be offered unprecedented opportunities to access information and services over the Internet, because people with disabilities for the most part use the Internet in the same way everyone else does.

Much of the base work on web accessibility (simply called the Web Content Accessibility Guidelines or WCAG) has been initiated by the international organization W3C. For the past several years W3C has researched, codified, and encouraged people to make their Web sites accessible. W3C also produced guidelines to help create accessible Web sites and continued to conduct research into how to make Web sites accessible.

More and more automatic tools are available on the Internet for web site designers to ensure the accessibility and usability of their web sites, such as: Bobby, LIFT, Netmechanic, etc. These tools are mostly free, enabling any designers to take advantage of them.

Although it seems that the legal and mandates of web accessibility of information resources, studies reviewing the accessibility and usability of online information for people with disabilities showed that the majority of online information still does not truly pay too much attention in information accessibility and usability.

4. Position by Athanasios Karoulis (The Adaptation of the Traditional Open and Distance Learning (ODL) Environments to the Web Concerning their Usability)

It seems that it is now the time for the worldwide acceptance and establishment of Open and Distance Learning (ODL). Its roots can be found in the industrial age, where economics started to accelerate and have spread to reach nowadays the information-based economy and globalization, where information is already the fourth productivity component together with the nature, the labor and the capital. Meanwhile, new terms have emerged, like *specialization*, *knowledgeable workers*, *continuous education*, and *life-long*

learning. Obviously, the traditional methods offered by common schools and universities, could no more help in this direction, so ODL was born.

On the other hand the continuing technological evolution supported the parallel emergence of technology-based distance learning environments, known nowadays as e-learning environments. They can be considered to be a subset of ODL, so they have to follow the basic axioms and the philosophy of ODL. This is the first core issue this presentation focuses on, namely the adaptation of the philosophy of ODL to web-based e-learning environments. In particular, what was the usability in general of the traditional ODL environments and how it is going to be transformed to the new e-learning ones without to confront to the axioms of ODL?

The birth of the Internet emerged a shift to the way we all work and communicate. The web supports two tasks simultaneously: to store and deliver information and to facilitate communication between the participants. Also, a major point of concern in this new medium is its usability. Factors, such as the download time are only the top of the iceberg. Moreover, the notion of the interaction between user and system is fully integrated in the essence of the web, yet many add-ons, plug-ins and aiding technologies are needed in order to realize it. Is their existence a facilitation or an impairment of web-usability? Do we characterize the contemporary state of the web as «usable» at all? Moreover, if we adapt this question to e-learning environments, in combination to the dual-nature of the Internet, we come up on two separate questions:

Is the storage and delivery of the educational information in contemporary e-learning environments usable? What must be done and what can't be done? What are the future trends?

Is the offered communication channel of the contemporary e-learning environments usable? How was it utilized in the traditional ODL environments, and how is it going to be transformed in the e-learning environments? What does it misses, and where does it make overuse? What was its usability how is it now, and how should it be redefined (if it should at all)?

These questions can be combined in their turn to one resultant question:

Is such an educational environment acceptable at all? In other words, does it rely on the correct educational theory, or is it just about the materialization of the front-end technologies in a, so-called, educational environment? How can one distinguish an effective e-learning environment, and what are its main characteristics?

This question leads in its turn to the notion of «lernability», which emerged recently in the relative literature. What are the points of concern for an e-learning environment to facilitate the acquisition of knowledge? It seems that we must consider the usability of the educational interface and the learnability of the educational context of the environment together, in other words to study the combination of these two factors. How exactly do they complex? Does usability influence learnability at all, and vice-versa?

At this point of this panel we shall try to summarize the most recent results from relevant studies, and investigate in how far they can guide the design of a contemporary e-learning environment.

In conclusion, the objective of this part of the panel is to clarify the framework in which e-learning environments must perform, concerning their usability and learnability. This framework involves parameters, such as the theoretical and instructional background, on which the environment bases, the communication channel and its materialization, the information content and context of the environment and, finally, to conclude on the notions of the usability and the learnability of the environment.

References

Nielsen, J. (2000). *Designing Web Usability.* Indianapolis, IN: New Riders Publishing.

Preece, J., Rogers, Y., Sharp, H., Benyon, D., Holland, S. & Carey, T. (1994). Human-computer interaction, Workingham. England: Addison-Wesley.

Cury, J.O. (2001). Young at heart, and online: The over-50 crowd finds empowerment, community and new friends on the Web [On-Line]. Available: http://www.buyingarizona.com/senior_source.html.

Mead, S., Spaulding, A., Sit, A., Meyer, & B., Walker, N. (1997). Effects of age and training on world wide web navigation strategies. Proc. Human Factors Society, Fourty-First Annual Meeting (pp. 152-156).

U.S. Census Bureau. (2000). Projections of the Total Resident Population by 5-Year Age Groups, and Sex with Special Age Categories: Middle Series, 2025 to 2045 [On-Line]. Available: http://www.census.gov/population/projections/nation/summary/np-t3-f.txt