

Discourse of Web Usability and Its Effects

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ABSTRACT

Web usability can be considered as an approach to make web sites easy to use for an end-user, without requiring any specialized training. Good web usability usually leads to pleasant user experience. As Web site become a gateway for most people to access information or conduct business. Web design with good usability is very critical to any organization. This paper first discusses the definition of Web usability and measurement of Web usability, and then discusses the effects of Web usability.

Keywords: Web Usability, Web Design, End-Users

INTRODUCTION

The concept of usability has been researched and applied in the human computer interface (HCI) area for a long time. The product designed with high degree of usability will not only earn customer's loyalty but also earn good image and significant profits for the company that produces the product. iPod from Apple Inc. is a well known successful story of user experience. As more companies set up their online stores and more consumers shop online, Web presence becomes a front line of a company. Customers will not stick with the company's web site if they don't have a pleasant experience of visiting the site.

Web usability is not only important to the profit organizations, it is also important to government organizations and non-profit organizations. In general, people will leave the Web site, if it is difficult to use. People may give up visiting the Web site if the contents are hard to read or the interface of the key functions is difficult to figure out. There are plenty of Web sites available in cyber space; people will simply go to another Web site that is friendlier to them.

Although every organization has different business models and provides different services to their customers or clients, the purpose of the Web frontend is the same – to provide a gateway for customers to get to know the organization better and further use or purchase their services. Web user interface is very critical to any organization. To user the interface is the system. It is only when users have pleasant experience with using web site then web site can attain the goals it intends to achieve.

A friendly gateway definitely will earn more customers than the unfriendly one. Since more people have access to broadband and online stores become widespread, Web usability is increasingly important for attracting customers and maintaining customer loyalty. Most web usability researches focus on the measurement of Web usability. However, there are few researches that focus on the effects of Web usability. The paper will explore the issues of Web usability effects. In the rest of this paper, first, the definition of Web usability will be discussed. Next, the previous researches about the measurement of Web usability will be reviewed. Then, the possible Web usability will be discussed. Lastly, the conclusion about Web usability will be offered.

THE DEFINITION OF WEB USABILITY

Usability is a concept rooted in HCI research. Typically, engineers identify a set of principles and common practices to ensure usability is the outcome of system design (Shneidermann & Plaisant 2010; Pearrow 2000; Nielsen 1993). ISO (International Standards Organization) 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” (ISO, in Bevan 2001). Applying the concept of usability defined by ISO to the Web design, a product means a computerized information system. Thus, usability can be defined as a “the extent to which a system with given functionality can be used efficiently, effectively, and satisfactorily by specific users to achieve specified goals in a specific context of use” (Te’nei, Carey, & Zhang 2007).

Nielsen (1993) views usability as part of system acceptability and defines usability as how well users can use the functionality or utility of a system. He considers that usability is not a single dimensional property, but a multiple dimensional property with several factors. These multiple factors include: learnability, efficiency, memorability, control of errors, and satisfaction (Nielsen n.d.). Applying usability in HCI to the Web design, Web usability can be considered as an approach to make web sites easy to use for an end-user, without requiring her (or him) to undergo any specialized training (Wikipedia n.d.). Web usability is generally regarded as user’s goals while interacting with the computer. Specifically, usability can be broke down into the following goals: effective to use (effectiveness), efficient to use (efficiency), safe to use (safety), having good utility (utility), easy to learn (learnability), easy to remember how to use (memorability) (Rogers, Sharp & Preece 2007, p. 20). As Web becomes an increasingly important interface, researchers focus more on the usability issues in the Web environment.

THE MEASUREMENTS OF WEB USABILITY

Extending the basic usability principle to the Web design, Nielsen (2000) identifies some usability attributes that are closely related to the web design. These attributes include navigation, response time, credibility, and content. The Web site is designed with easy-to-use navigation, frequent updating, minimal download time, relevance to users, and high-quality contents will present higher Web usability to users.

Researchers are continuously identifying the different approaches that can improve the ease of use of the Web (Ivory & Megraw 2005; Levi & Conrad 1996). An information-centric

Web interface is a mix of text, link, and graphic elements. The formatting and various aspects of these elements can seriously affect Web usability and quality. The measurement of Web usability typically focus on the download delay, success in finding a page, and organization of the information gathered during a Web session (Ivory & Megraw 2005). A system that demonstrates high usability should satisfy performance, functional, and interface requirements (Shneiderman & Plaisant 2010).

Ivory & Megraw (2005) proposed a conceptual model of Web interfaces to evaluate Web usability. At the site level, *site architecture* is evaluated. Site architecture measures include consistency of page elements, page formatting and performance, and site size. At the page level, the measures include *page performance* (page download speed, page accessibility, and presence of HTML errors) and *page formatting* (color use, fonts, page size, use of interactive elements, and page style control). At the element level, the measures include *text element* (amount of text, type, quality, and complexity), *link element* (number and type of links), *graphic element* (number and type of images), *text formatting* (text color, font style, size, underline, and emphasized), *link formatting* (color used for links, whether the links are underlined), and *graphic formatting* (image width and height; page area covered by images).

Cappel and Huang (2007) study Web site usability by analyzing the contents of the Web site of INC. 500 companies. Their investigation addresses eleven measures organized into three categories: *web design errors*, *web design conventions*, and *design features to promote usability*. Web design errors include three measures: (1) use of splash screen, (2) horizontal scrolling, and (3) self-Link on home Page. Web design conventions include five measures: (1) links are underlined; (2) links are blue; (3) link appearance changes after it is clicked; (4) a company logo appears as a "Home" link on internal pages; and (5) a "Home" text link appears on internal pages. Design features to promote usability include three measures: (1) breadcrumb trail, (2) site search capability, and (3) FAQ or help option. The results their study suggest three categories of outcomes: (1) usability guidelines that are frequently followed by companies and overall, do not appear to be a significant problem in web design; (2) guidelines where practices are highly variable but whose impact may not be as strong as some sources suggested a few years ago; and (3) guidelines that are not followed consistently and represent opportunities to improve web usability in a measurable way. Usability studies by Cappel and Huang (2007) also demonstrate that many users are impatient on the web - they want to find what they want quickly and easily. Websites should not present obstacles or leave users wondering about how to perform desired operations.

Web sites usability study conducted by Palmer (2002) uses five factors to measure Web site usability including *download delay* (initial access speed; speed of display between pages), *navigability* (arrangement, sequence, links, and layout), *content richness* (amount of information, variety of information and content quality), *responsiveness* (feedback and FAQ), and *user interactivity* (customization and interactivity). The results of their study demonstrate the sufficient reliability and validity.

Although Web usability researchers all suggest that Web usability is a multidimensional construct, not every empirical study support this concept. Green & Pearson (2006) develop an instrument to measure Web usability based on ISO 9241-11 definition. The instrument they developed measure five factors (effectiveness, efficiency, engagement, error tolerance, and ease

of learning) of Web site usability. Use 375 undergraduate business students from a large Midwestern university as a sample to test the instrument. The results of their study show that the instrument does not fully encompass all the dimensions of Web site usability.

THE EFFECTS OF WEB USABILITY

Both HCI and IS researchers claim that Web usability affects the user's attitude and behavior. Web usability not only influences the behavior of using Web site (Palmer 2002; Nielsen 2000), but also affect user's purchasing behavior and decision (Parboteeah, Valacich, & Wells 2009; Venkatesh & Agarwal 2006). Researchers also report that Web usability is also indirectly help organization reducing cost (Nielsen, 2007) and increase return on investment (Nielsen, 2008).

Palmer (2002) conducted three studies that developed and validated Web site usability and performance metrics. Web site usability measure includes download delay, navigability, site content, interactivity, and responsiveness. User attitude and behavior (including user satisfaction, the likelihood of return, and the frequency of use) were use to measure Web site success. The results of the studies suggest that Web site success is a first-order construct. Moreover, Web site success is significantly associated with Web site download delay, navigation, content, interactivity, and responsiveness.

Other Web usability researchers report the similar results that usability is associated with important outcomes such as error reduction, positive attitudes, and increased use (Nielsen 2000). In addition, research show that Web usability is related with user performance (Chadwick-Dias, McNulty, & Tullis 2003). The research conducted by Teo et al. (2003) suggest that increased level of interactivity on a Web site have positive effects on user's perceived satisfaction, effectiveness, efficiency, value, and overall attitude towards a Web site.

The impact of Web usability on business can hardly be ignored. Market researcher Forrester Research and Bradford, Massachusetts-based usability testing firm, conducted a study in 2000 that found serious usability flaws on thirty leading e-commerce sites. Forrester Research reported that 27 percent of all Web transactions were abandoned when users reached the payment Web page. Because of lacking web site usability, these e-commerce sites lost potential revenues. According to a study by Redwood, California-based Zona Research, U.S. Web sites lost an estimated \$25 billion in revenue due to slow Web site performance alone (Free Encyclopedia of Ecommerce).

The results of academic researches echo the survey results by practitioners. The empirical study conducted by Venkatesh and Agarwal (2006) shows that Web usability (measured by content, ease of use, promotion, made-for-the-medium, and emotion) does not only shape user's experience, but also predict the actual purchase behavior. Two studies conducted by Parboteeah, Valacich & Wells (2009) suggest that online purchasing behavior was directly influenced by varying the quality of task-relevant and mood-relevant cues of website. Task-relevant cues include characteristics, such as navigability, that help in the attainment of the online consumer's shopping goal. While mood-relevant cues refer to the characteristics, such as

visual appeal, that affect the degree to which a user enjoys browsing a website but that do not directly support a particular shopping goal.

CONCLUSION

Web site design is ultimately designing user's experience. Most web sites are designed for the users who are outside of the domain of the organization that provides web site. In most cases, organizations have no control over the users at all. Under this circumstance, designing for Web usability become extremely important. User experience will be shaped by the following situations: whether the page will load quickly; whether user can find everything he/she is looking for; whether all links are "live"; whether the site's navigation is easy to follow. Only when users have a satisfying experience, the web site can achieve what it intends to do.

As Web sites become an important channel to access information and conduct business for most people, it is critical for both profit and non-profit organizations to invest resource to evaluate web usability of their web sites. Usability evaluation is a series activity including: (1) defining usability requirements, (2) creating an evaluation plan, (3) conducting one or more evaluation session, (4) performing data analysis, and (5) interpreting results (Stone et al. 2005). In addition, Usability evaluation is not one time practice, but a continuous process. The result of the interpretation will be used to refine the usability requirements and trigger another cycle of usability evaluation. This paper provides the information of the potential criteria to evaluate Web usability and possible outcomes of Web usability.

References, tables and figures are available upon request.