

# Cultural Adaptivity For Sustainable User Interface:

## Investigating User Expectation On ASEAN Country

[ Aslina Baharum, Azizah Jaafar ]

**Abstract**—This study investigates user interface with cultural adaptivity on user expectation from ASEAN cultural group. Cultural adaptivity was believed to enhance the usability of user interface websites to attract large numbers of users. The findings lead to the conclusion that provides a user interface for various countries is not enough, due to the difficulty of pinning down cultural background. Localized user interfaces usually modify the most obvious elements to meet the target country and/or region, for instance by adapting to different languages and regional characteristic. Despite this fact, research has acknowledged, the culture does not keep within the boundaries. Research has shown that the interpretation of the national culture, in which the term is leveled with a particular country, will bundle a lot of choice. Thus, localization of objects can help users to navigate the web and access information easily. Environment of different countries and different cultures can interoperate in the context of adaptation and needs to take into account for adaptive support in the context of collaborative activities. This study will also be able to improve the accuracy of regional expectations.

**Keywords**— Culture, Adaptivity, Cultural Diversity, Sustainability, User Interface, Localization, Web Objects, User Expectation.

### I. Introduction

Based on Internet usage statistics ([www.internetworldstats.com/stats.htm](http://www.internetworldstats.com/stats.htm)) retrieved in March 26, 2013, Internet users were over 2 billion worldwide, with an increase of 566.4 percent from 2000 to 2012. With the rapidly growing number of websites on the Internet, searching the best information increasingly becomes a search for the best information presentation.

Reinecke (2011) claimed that many sites simply contradict one's personal understanding of good design. But even worse, bad design often occurs in tandem with bad usability [1]. This fact also generally agreed by professional analyst and designers that well-designed user interfaces improve the performance and appeal of the Web, helping to convert "tourists" or "browsers" to "residents" and "customers" [2]. If ignored, many users rightly decide on another, more attractive and usable web site offering similar content [3]. With this in mind, research has long been discussed the magic formula for aesthetic design, and try to determine what is seen as beautiful and usable.

---

Aslina Baharum  
Institute of Visual Informatics, National University of Malaysia (UKM)  
43600 Bangi, Selangor, Malaysia

Prof. Madya Azizah Jaafar  
Institute of Visual Informatics, National University of Malaysia (UKM)  
43600 Bangi, Selangor, Malaysia

Reinecke (2011) further in his paper stated that it seems that we can already publicly what users consider use and attractive [1]. Some aspects, however, a matter of personal taste [4], or influenced by cultural values [5]. Same convention applies to the choice of the user interface, which is very different in cultures [6].

The user interface development process focuses attention on understanding users and acknowledging demographic diversity. But in a global economy, these differences may reflect worldwide cultures [2]. Users also differ in their design preferences and in their perception of usability at the country level [7, 8]. The importance of considering culture as determined partialities for a certain look and feel of user interfaces has been demonstrated many times. For example, interfaces designed for users of a particular country are considered to be more attractive [9], and improved the work efficiency of those they were intended for [10, 11, 2]. Unfortunately, in this case, designers will soon encounter problems because of the complex and intangible nature of cultural background [1]. Based on paper by Noiwan and Norcio (2006), although there are a number of studies (e.g., [12, 13]) show that taking cultural diversity into account in a design process, particularly in interface design, is essential, still, cultural studies in HCI are limited [16].

According to a poll conducted by Harris Interactive Inc., 89 percent of all online customers have experienced problems when trying to complete transactions online, and as a result 34 percent have turned to a competitor. This demonstrates that important user's expectation for usability. Marcus & Gould, (2000) stated that companies that want to do international business on the web should consider the impact of culture on the understanding and use of Web-based communication, content, and tools [2].

To bridge this dichotomy between the need for a website that caters to individual cultural background, and inexpensive method to develop them, this study uses an approach called cultural adaptivity by the user expectations of localization web object. The idea is that websites automatically switches to prefer interface based on the country selected of its users. This study expect cultural adaptivity to improve performance, and user satisfaction of a personalized website compared with non-adapted version of the same site.

### A. Concept of Culture

Culture is an abstract, complex and has been defined in various ways. Hofstede (1991) defines culture as "Software of the mind" [14]. Segall et al. (1999) assert, "Any experience a person has is influenced by that person's previous experiences [15]. To the extend that previous experience are determined by the accident of birth at a particular time in a particular place, it

becomes probable that the ‘same’ event will be different events, even in very fundamental ways, to members of different cultural groups.” Culture might include behavioral products, values, languages, ways of life of ancestors, shared preferences, rules, norms, attitudes, and beliefs [15]. Cultural elements are transmitted, shaped and taught among people in each particular culture, thereby differentiating a culture from one another [15, 16].

Reinecke (2011) also stated that although culture has been described many times, cultural anthropologists have long agreed that the term cannot be pinned to a finite definition [1, 17]. Researchers often outlined the aspects that influence the culture: For one, this is a person born to a national identity, which is often equated with the country of origin [18]. Anthropologists have a more comprehensive understanding, they distinguish between ‘place’ refers to where a person is currently located, and ‘space’, which reflects the combination of a person’s mental as in the case of cultural ambiguity [19].

In addition, there are many aspects of culture that have been found to affect the choice of the face, such as the user’s first and second language [6, 20], religion [21], educational level and form of education. Other factors are social norms and political, that influences whether people consider themselves centeredly, or sees themselves as part of the group [22, 6, 1].

## B. Cultural Adaptivity

In the approach to cultural adaptivity, the influence on the culture needs to be taken about each user, stored in personal user model example, and mapped to the user interface adaptations.

Research provides evidence of cultural differences on the web [23], especially with regard to content [24] or perceived usability, satisfaction and user trust [25]. Some authors also suggest that “language, culture, religion, and other factors may be important to a user’s impression of the website” [26]. There is, however, limited studies have linked the efficiency and user-friendliness of a website with culture background. So far, studies on the culture and the website has focused on comparisons between very different cultures like the United States and Japan [23] or the US and Korea [27]. These authors found language and culture to be the reasons for major differences concerning the content and design features of websites. Hillier (2002) also suggested a review of the context of language, culture and usability of websites comparing Western and Eastern cultures [28].

This study will find the differences and preferences for ten ASEAN country; Malaysia, Bangkok, Cambodia, Indonesia, Laos PDR, Myanmar, Singapore, Thailand, Philippines and Brunei.

## II. Methodology

This study examined the location of ten selected web objects. A data sheet 7 x 6 horizontal and vertical grid squares was used (see Fig. 3) to visualize the web interface. This was

similar to the method used by previous studies on general websites [29, 30, 31, 32], e-commerce websites [33, 34, 35, 36], and library websites [37]. Web objects that are common to most websites were evaluated. There are Logo, Site title, Internal and External links, Login, Search and Advertisement. However, to suit the needs and requirements of the new century, three other web objects added namely; Language selection, Content and Calendar. This is because, the important of the web objects for cross-country in line with current technology and information.

### A. Participants

The participants were collected from 10 ASEAN countries as shown in Figure 1. A total of 94 participants comprising 60 males and 34 females completed the survey of the expected location of every tens web objects. 71% of the participants were above the age of 30 years and 80% stated that they use a computer everyday. All participants use English as their first or second language. This shows that they are familiar with websites in English. The majority of participants (76%) reported that they were either in computer and science field. Only 24% of participants in fields such as business, law, marketing and banking. Participant selection criteria: (1) Participants must reside or have lived more years in an ASEAN country and not in another country/countries; (2) Participants must have a computer literate and at least be familiar with the site.

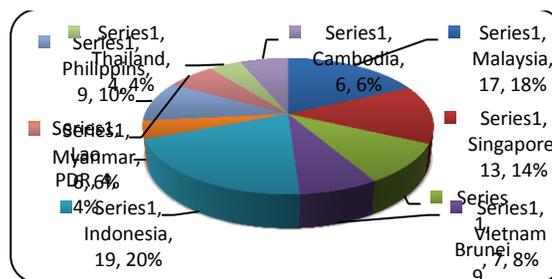


Figure1. Participants from different countries distribution

### B. Procedure

A method similar to that done by Bernard & Sheshadri (2004) was adopted [35]. Users were presented with a demographic questionnaire followed by a page containing the picture of a browser window. A mock browser window, which consists of seven vertical and six horizontal grid squares is used to represent the interface browser window. Each grid square was divided into nine groups for easy name the localization (see Figure 2).

Participants would then complete the survey either online or offline that examines the expectation of their users to a particular web objects location. The participants were asked to place each object in mock web browser, using the code number assigned to each web object listed. Numbering could be placed horizontally or vertically. Results achieved with the highest number of times participants selected each square to each web object.

Square number, depending on which web objects they represent. This was to estimate the actual size of those on the

website. For example, Advertisement can occupy three squares, while Internal and External link objects can occupy two squares, and Logo, Login, Language selection and Search objects can occupy one square. The parts namely as in Figure 2.

1	1	2	2	2	3	3
1	1	2	2	2	3	3
4	4	5	5	5	6	6
4	4	5	5	5	6	6
7	7	8	8	8	9	9
7	7	8	8	8	9	9

1. Top-left
2. Top-center
3. Top-right
4. Left side
5. Center
6. Right side
7. Lower-left
8. Lower-center
9. Lower-right

Figure 2. Description of nine parts location

### III. Results & Discussion

The findings were categorized into seven groups based on country's background characteristics, country; age; education level; profession/activity; religion; computer literacy; gender; and being abroad. Each group was divided into two to three categories. The highest frequency chosen by the participants selected as a priority for every user expectations localization web objects. Based on that, there were three layouts results found (see Table 1).

Table 1. Results from respondent's expectations

	Result 1:	Result 2:	Result 3:
<b>1. Logo</b>	Top-left	Top-left	Top-left
<b>2. Site title</b>	Top-center	Top-center	Top-center
<b>3. Internal links</b>	Top	Left	Left
<b>4. External links</b>	Left	Lower	Right
<b>5. Login</b>	Top-right	Top-right	Top-right
<b>6. Language selection</b>	Top-right	Top-right	Top-right
<b>7. Search</b>	Top-right	Top-right	Left
<b>8. Content</b>	Left to center	Left to center	Left to center
<b>9. Calendar</b>	Left	Right	Right
<b>10. Advertisement</b>	Right	Right	Lower
	<b>* Laos PDR, Brunei, Singapore, Philippine, Myanmar &amp; Vietnam</b>	<b>* Malaysia &amp; Indonesia</b>	<b>* Thailand &amp; Cambodia</b>

Based on the results, the result 1 shared preferences layout design between six countries, Laos PDR, Brunei, Singapore, Philippine, Myanmar and Vietnam (see Figure 3). Where as Malaysia and Indonesia had the same layout on the expected on result 2 (see Figure 4). And result 3 was for Thailand and Cambodia layout preference (see Figure 5).

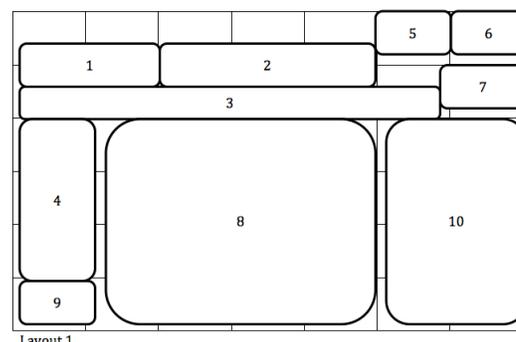


Figure 3. Layout for Result 1

Malaysia and Indonesia shared same preferences (see Figure 4). This probably because both are foreign bilateral relations which are two neighboring countries that shared similarities in many aspects. Both have many common characteristic traits, including common frames of reference in history, culture and religion. Although both countries are separate and independent states, there are also similarities embedded their national languages; Indonesian and Malay languages are closely related. The majority of the population in both countries is the Malays, with significant Malay culture shared among them. Both are also mostly population believe in Islam, so they have Islamic culture. In addition, significant number of Indonesian migrants in Malaysia-original demographic of both countries today is often involved in disputes claims of the original culture.

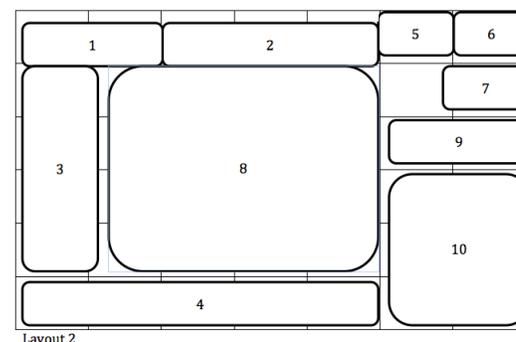


Figure 4. Layout for Result 2

For Thailand and Cambodia, both are some cultural similarities with the beliefs and traditions that are identical or similar (see Figure 5). In particular religion such as Buddhism is a factor that causes a same tradition. Among the neighboring ASEAN countries, none seems more similar to Thailand than Cambodia. Both nations share similar customs, traditions, beliefs, and ways of life. This is true of royal customs, language, writing systems, vocabulary, literature, and the dramatic arts.

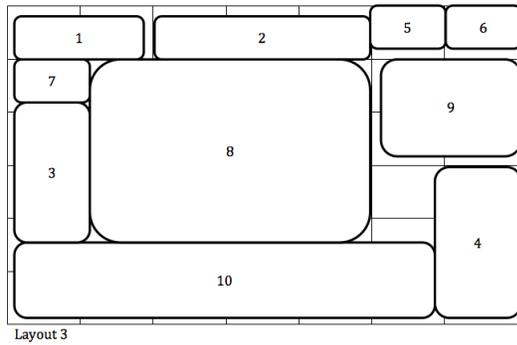


Figure 5. Layout for Result 3

Table 2. Results from respondent’s expectations

No.	Web object	Location	Similar study	Differ study
1.	Logo	Top-left	Adkisson (2002)	-
2.	Site title	Top-center	Bernard (2001a, 2001b)	-
3.	Internal links	Top or left	Bernard (2000, 2001b), Shaikh & Lenz (2006)	Bernard (2001a); Bernard & Shesadri (2004)
4.	External links	Lower, left or right	Bernard (2000, 2001a)	Bernard (2001b); Bernard & Shesadri (2004) – left & right
5.	Login	Top-right	Adkisson (2002)	Bernard (2002); Costa (2010) – top-left
6.	Language selection	Top-right	-	-
7.	Search	Top-right or left	Shaikh & Lenz (2006); Vasantha & Harinarayana (2011); Bernard (2002); Adkisson (2002)	[Bernard (2000, 2001a, 2001b, 2002); Costa (2010) - top-center]
8.	Content	Left to center	-	-
9.	Calendar	Right or left	-	-
10.	Advertisements	Right or lower	Shaikh & Lenz (2006)	Bernard (2000, 2001a, 2001b); Bernard & Shesadri (2004); Costa (2010) - top

Based on the results, half of the web objects were similar location expectation; logo (top-left), site title (top-center), login (top-right), language selection (top-right), content (left to center). For Internal links, two of the results found that should locate on the left side of the site and other result was on top. Unlike the external links were the three results were all different, on left or right or lower of the site. Next search, two of the three results were similar found on top-right or on left side. Where as for calendar, the same results were two results were on the right and the left side for the third result. Expectations for the search engine to be located at top-right may occur because most search engine sites place their search field at the top-right portion of their website as ipni.com, cbd.int and bharian.com.my. For advertisement also, two results have found it should locate on right side and the lower site for other result. Studies from Benway & Lane (1998) have

shown that banner advertisements are effective [38]. Spool et al. (1997) found in usability tests that users turn to navigation bars after determining that the page does not contain the information they need. At this point the user tends to scroll up or down the page. Users began to view the page in the center, and if what they want is not located in the center examine the top and bottom of the page [39]. Therefore, it is not advisable to place the important items at the top because users often look there last. The ten web objects selected on a priority basis in the website and the user interface based on previous studies.

This study revealed that the placement of the ten web objects strengthens the previous findings for general websites [29, 30, 31, 32], an e-commerce websites [34], and the library websites [37] (see Table 2).

## IV. CONCLUSIONS

The result was emphasized by users’ expectation, showing that they located the web objects based on their expectation that object supposed to be located significantly easier to use. This results in line with previous studies on location mental model web objects.

In an overall comparison of the three results layout interface, all of the aforementioned results were again verified: a significant majority of 60% favored layout result 1 culturally adapted interface, a remarkable 20% found for layout result 2, and 20% with layout result 3.

These results demonstrate an exceptional benefit for culturally adapted interfaces over providing users with a Webpage’s “standard” version for sustainable interface. This also indicate that the conventional understanding of “good” user interface design has to be seen in the context of cultural differences: In our eyes, it is not feasible to find a magic formula for what international users perceive as usable and beautiful, and correspondingly, the practice of designing one interface for all is unlikely to satisfy users’ expectations. In contrast, culturally adaptive interfaces seem to be a promising solution to anticipate what users like, and to improve their user experience, no matter where they come from.

## References

- [1.] K. Reinecke and A. Bernstein, “Improving Performance, Perceived Usability, and Aesthetics With Culturally Adaptive User Interfaces”, *Acm Transactions On Computer-Human Interaction*. Vol. 18. No. 2. Article 8, Pp. 8:1-8:29, 2011.
- [2.] A. Marcus and E. W. Gould, “Crosscurrents Cultural Dimensions and Global Web User-Interface Design”, 2000, 32–46.
- [3.] G. Lindgaard and C. Dudek, “What Is This Evasive Beast We Call User Satisfaction? Interact”, *Comput.* 15, 3, 2003, 429–452.
- [4.] D. A. Norman, *Emotional Design: Why We Love (Or Hate) Everyday Things*. Basic Books, New York, 2004.
- [5.] M. Ito and K. Nakakoji, “Impact Of Culture On User Interface Design”, In *International User Interfaces*, Wiley, 1996, 105–126.

- [6.] R. Nisbett, *The Geography Of Thought*. Free Press, New York, 2003.
- [7.] W. Barber and A. Badre, "Culturability: The Merging Of Culture And Usability", Presented at The Conference On Human Factors And The Web, Basking Ridge, New Jersey: At&T Labs. Retrieved 1998, From <http://Zing.Ncsl.Nist.Gov/Hfweb/Att4/Proceedings/Barber/>
- [8.] E. Callahan, "Cultural similarities and differences in the design of university Websites", *J. Comput.-Mediat. Comm.* 11, 1, 2005.
- [9.] B. Corbitt, T. Thanasankit, and J. Haynes, "A Model For Culturally Informed Web Interfaces", In *Internet Management Issues: A Global Perspective*, Igi Global, 2002, 1–26.
- [10.] A. Badre, "The effects of cross cultural interface design orientation on World Wide Web user performance", *GVU Tech Reports 2000* [<http://www.cc.gatech.edu/gvu/reports/2001/>]
- [11.] G. Ford and H. Gelderblom, "The Effects Of Culture On Performance Achieved Through The Use Of Human Computer Interaction" In *Proceedings Of The Conference On Enablement Through Technology*, 2003.
- [12.] N. Tractinsky, "Aesthetics and Apparent Usability: Empirically Assessing Cultural and Methodological Issues", Paper presented at the Conference on Human Factors in Computing System. CHI' 97. Atlanta, Georgia, 1997.
- [13.] J. Dong, and G. Salvendy, "Designing menus for the Chinese population: horizontal or vertical? *Behaviour & Information Technology*", 18 (6), 1999, 467-471.
- [14.] G. Hofstede, *Cultures and Organizations: Software for the Mind*. McGraw Hill. London, 1991.
- [15.] M. H. Segall, P. R. Dasen, J. W. Berry, Y. H. Poortinga, *Human Behavior in Global Perspective: An Introduction to Cross-Cultural Psychology*, second ed. Simon & Schuster, MA, 1999.
- [16.] J. Noiwan and A. F. Norcio, "Cultural differences on attention and perceived usability: Investigating color combinations of animated graphics", *Human-Computer Studies* (64): 103-122, 2006.
- [17.] A. Kroeber and C. Kluckhohn, *Culture: A Critical Review Of Concepts And Definitions*. Vintage Books, 1952.
- [18.] P. Rogers and J. Tan, "Fifty Years Of Intercultural Study: A Continuum Of Perspectives For Research And Teaching", Tech. Rep., Ross School Of Business, 2008.
- [19.] A. Gupta and J. Ferguson, "Anthropological Locations: Boundaries and Grounds Of A Field Science", University Of California Press, Berkeley, Ca, 1997.
- [20.] K. Rose, "Aspekte Der Interkulturellen Systemgestaltunllj", In *Proceedings Of The Conference Mensch Und Computer'05. Kunst Und Wissenschaft, Grenzüberschreitungen Der Interaktiven Art*, 2005.
- [21.] H. Siala, R. O'keefe and K. Hone, "The Impact Of Religious Affiliation On Trust In The Context Of Electronic Commerce", *Interact. Comput.* 2004.
- [22.] S. Schmid-Isler, "The Language Of Digital Genres—A Semiotic Investigation Of Style And Iconology On The World Wide Web. *System Sciences*", 2000.
- [23.] N. Singh and H. Matsuo, "Measuring cultural adaptation on the Web: a content analytic study of U.S. and Japanese Web sites", *Journal of Business Research*, 57 (8): 864-872, 2004.
- [24.] S. S. Robbins and A. C. Stylianou, "Global Corporate Web Sites: An Empirical Investigation Of Content And Design", *Information & Management*, 40 (3): 205-212, 2003.
- [25.] C. Flavián, M. Guinalú, and R. Gurrea, "The role played by perceived usability, satisfaction and consumer trust on website loyalty", *Information & Management*, 43: 1-14, 2006.
- [26.] J. van Iwaarden, T. van der Wiele, L. Ball and R. Millen, "Perceptions about the quality of web sites: a survey amongst students at Northeastern University and Erasmus University", *Information & Management*, 41 (8): 947-959, 2004
- [27.] J. Choi, and L.V. Geistfeld, "A cross-cultural investigation of consumer shopping adoption", *Journal of Economic Psychology*, 25 (6): 821-838, 2004.
- [28.] M. Hillier, "Multilingual website usability: Cultural context", proceedings of the International Conference on Electronic Commerce 2002, 22-25 October, Hong Kong, China, 2002.
- [29.] M. L. Bernard, "Examining user expectations of the location of web objects", *ITG Internetworking 3.3* [Online], 2000, Retrieved from [http://www.internetg.org/newsletter/dec00/article\\_bernard.html](http://www.internetg.org/newsletter/dec00/article_bernard.html)
- [30.] M. Bernard, "Developing Schemas for the Location of Common Web Objects", *Usability News*, 3.1, 2001a, Retrieved from <http://chnm.gmu.edu/digitalhistory/links/pdf/chapter4/4.26b.pdf>
- [31.] M. Bernard, "User Expectations for the Location of Web Objects", *Chi'01 Extended Abstracts On Human Factors In Computer Systems*, 2001b, pp. 171. Retrieved from <http://psychology.wichita.edu/hci/projects/CHI%20web%20objects.pdf>
- [32.] A. D. Shaikh, and K. Lenz, "Where's The Search? Re-Examining User Expectations Of Web Objects", *Usability News*, 8(1), 2006, Retrieved From <http://Www.Surl.Org/Usabilitynews/81/Webobjects.Asp>
- [33.] M. Bernard, "Examining user expectations for the location of common e-commerce web objects", *Usability News*, 4(1), 2002, Retrieved December 16, 2009, from [http://www.surl.org/usabilitynews/41/web\\_object-ecom.asp](http://www.surl.org/usabilitynews/41/web_object-ecom.asp)
- [34.] H. Adkisson, "Identifying de-facto standards for e-commerce web sites" (Unpublished master thesis). University of Washington, Washington: US, 2002.
- [35.] M. Bernard and A. Sheshadri, "Preliminary examination of global expectations of users' mental models for e-commerce web layouts", *Usability News*, 6(2). Retrieved (2004), from [http://www.surl.org/usabilitynews/62/web\\_object\\_international.asp](http://www.surl.org/usabilitynews/62/web_object_international.asp)
- [36.] C. Costa, "Cultural Factors And Usability User Expectations For The Location Of E-Commerce Web Objects Case Study In Portugal", 2010.
- [37.] R. N. Vasantha And N. S. Harinarayana, "Identifying The Location Of Web Objects: A Study Of Library Websites", 8th International Caliber - 2011, Goa University, Goa. Paper Presented At 8<sup>th</sup> *International Caliber*, 2011, Pp. 28-39.
- [38.] J. P. Benway, and D.M. Lane, "Banner Blindness: Web Searchers Often Miss "Obvious" Links". *Itg Newsletter* 1.3, 1998, pp. 1–10. Retrieved from [http://www.sandia.gov/itg/newsletter/dec98/Banner\\_Blindness.htm](http://www.sandia.gov/itg/newsletter/dec98/Banner_Blindness.htm)
- [39.] J. M. Spool, T. Scanlon, W. Schroeder, C. Snyder and T. DeAngelo, *Web Site Usability: A Designer's Guide*. Morgan Kaufmann Publishers, 1997.