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Business Website Design: Some Emerging Standards for Developers

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Design is done for a reason, and if you do it well your business will prosper. If you do it poorly, people will leave your website.

Jakob Nielsen, *internet.au*, October 2002

INTRODUCTION

There can be little doubt that an increasing amount of business is being done on the internet. The websites that are at the center of this new way of thinking and working are a constantly growing and evolving entity. It is also clear that a website must evolve with time to reflect the changing needs of the organisation it represents and the organisation's user community. Websites that have been designed appropriately will have a definitive edge in attracting users in the emergent trend of electronic commerce (Fisher, 1999). Forresters Research has found that simplicity in website design is of paramount importance in that it contributes to successful website use (Cavanagh, 1999) and simple web design has been advocated as the differentiator between a successful and unsuccessful website (internet.au, 2002; Nielsen, 2000).

Website design is also an evolving practice (Sellitto & Wenn, 2000). Whilst Brody (1996) suggests that good design should aim at making information visible and manageable – good design needs constant redesign. Appropriate web design should utilise information as its currency with interface design being a vehicle for conveying that information.

In an earlier paper, we proposed some standards that encompassed issues associated with accessibility, proper encoding and metadata inclusion (Wenn & Sellitto, 2001). This paper examines some of the less technical features of website development focusing on issues associated with the visual and information design aspects of websites. These issues generally have a higher degree of subjectivity – they include the areas of information quality, effective information visualisation and presentation design.

EVALUATING AND PROMOTING INFORMATION QUALITY

The Web is a valuable resource for people seeking information, however because information on the Web is subject to change, up-grade and alteration it is difficult to assess for quality and accuracy (Sellitto, 2001a). Traditionally, many information publications such as books, journals, manuscripts have been required to meet an editorial review process before being printed which has assisted in implementing a quality control mechanism. However, with the proliferation of the World Wide Web, this review process can be circumvented allowing individuals to easily publish on-line (Sellitto, 2002). Consequently, issues associated with information quality become important for all web developers.

Not all web information is created equally and some web information is more valuable than others. Web information quality can be gauged by factors such as value, reliability, currency, content and source (Davenport, 1997; Sellitto, 2002). The quality of on-line information is thus integral to web design. Poor quality of information can be considered to be a reflection on web design.

The library community has historically evaluated information quality in the traditional print media using criteria such as content, purpose, scope, currency and cost (Gordon-Murnane, 1999). When it comes to evaluating web information, the library community has provided numerous suggestions for establishing criteria for determining on-line information quality. In addition to this list, Phillips from UC Berkeley suggests that there if there are links to external sites then an evaluation of these links should be provided (Phillips, 1998). A *critical thinking* approach to web information evaluation has been suggested by Grassian (1998), where sources of the information form the primary criteria for information validity.

The Grassian list of assessment criteria includes:

- Content and Evaluation— Who does the site represent? Is the information based on research or scholarly undertakings? Are references available?
- Source and Date— Who is the author and what expertise do they have? When was the web page produced, updated, revised and authorised?
- Structure— Is the structure and presentation style of the information consistent with the discipline that it represents?

Another methodology for evaluating on-line information is based on applying a series of questions to an informational web page (Alexander & Tate, 1999). Each affirmative response to a question posed about the information would suggest the information is of a high quality (high scores equate with high quality information).

Alexander and Tate identify five criteria on which to evaluate and score for information quality:

- Authority— Can the author of the information be identified? Is there a telephone number or postal address stated? Is there copyright or disclaimer?
- Accuracy— Can the information be collaborated in other sources? Are there referees listed for further investigation?
- Currency— Are there dates indicating when the web page was first created, updated and/or revised? Is the information current?
- Objectivity— Is the information provided as a public source (.gov or .org URL inclusion)? Is the information free of advertising? If advertising exists is it related to the information content?
- Coverage— Is the information complete? Is the information part of a larger piece of work?

Berkman (1998) provides a business perspective to on-line information evaluation. The assessment criteria he suggests addresses business requirements for using information to gain market advantage and strategic position. Berkman's checklist for assessing the quality of business resources includes measures such as how searchable the information is, timeliness, how frequently updated and information storage. The assumption is that such assessment is applied to sources after they have been found to be credible. Davenport (1997), on the other hand, identifies information and knowledge as being integral to an organisation

and suggests some six categories for assessing information— accuracy, timeliness, accessibility, engagement, applicability and rarity.

The following set of good practice guidelines for evaluating and promoting information quality can be proposed:

Achieving information authority and currency
- Display the company or an author's name on all web pages
- A date of the last web page modification or revision should be always displayed
- A contact email AND either a telephone number and/or postal address needs to be provided

Meeting Information Accuracy
- References and sources should be provided when factual or corporate information is listed
- If linking to other sites the provide a brief assessment of each link

Addressing information structure
- The information should be presented in the style that the websites visitor community would be accustomed

INFORMATION PRESENTATION ASPECTS OF WEB DESIGN

Standards that relate to the visual and presentation aspects of web design are not clearly defined. Numerous authors (Nielsen, 2000; Norman, 1998; Schneidermann, 1999) advocate the practice of simplicity and elegance in web page design to convey the greatest amount of information to the user. The success of a website is not solely reliant on the implementation of technical standards considering that a site with numerous encoding errors and/or poor accessibility adaptation can be very successful (Sellitto & Wenn, 2000).

Good design for human interface interaction can be achieved by using an uncluttered screen layout, this in turn encourages the fluid delivery of information (Brody, 1996). Fuccella and Pizzolato (1999) suggest that a well designed website needs to incorporate a successful fusion of important web entities and elements including— navigation, graphics, content and interface layout. Lynch and Horton (1999) further indicate that important characteristics of website and web page design needs to address aspects of navigation, interface design, graphics and multimedia. Small and Amone (1999) argue that motivational aspects of a website are important design features which encourages users to be 'sticky' and keep coming back. Thus it appears that some of the important issues that good web design practice should address and encompass are website navigation, graphics and images and information presentation and display. These are discussed in the following section.

Website Navigation

On-line navigation is not easy. Users can arrive at a web page from numerous points ranging from links that are internal to a site, a source external to the site or a search engine listing. Consequently, some key questions that users find themselves asking (Powell, 2000) are:
- Where am I?
- Where can I go to next?
- Have I been there before?
- Can I get home from here?
- How did I get here?

Users do not see some web page links because they are not evident, thus links must be clearly designated to remove uncertainty on the part of users. To instil a sense of control when moving about a site, navigation cues should be provided on each page of a website (Nielsen, 2000). Research has shown that when users were given visual cues to locate links, as opposed to using the pointer to search for links, they were able to find the information seven times faster (Bailey, Koyani, & Nall, 2000).

Appropriate navigation cues can be easily achieved by simple and elegant menu bars located at the top or bottom of a page. It has been found that important links and information needs to be positioned higher on a web page (Bailey et al., 2000). This will allow users to move *through* a website with some sense of control and not have the feeling of being lost. Websites that have deeply nested pages should provide a means of letting a user know where they are located which can easily be achieved by using a visual trail (for example a breadcrumb trail) or a hierarchical map (Nielsen, 2000).

Unvisited links need to be blue and underlined and users should not be required to move the mouse to determine where links are on a page (Lynch & Horton, 1999; Nielsen, 2000). It has become a standard to show visited links as purple, allowing website visitor to see where they have been, and it is good practice to distinguish between internally directed links and links that point to a different website (Spool, Scanlon, Schroeder, Snyder, & DeAngelo, 1997). Spool and colleagues further suggest that because users can be slowed down when they are confronted with similar looking links that it is appropriate that links be descriptively labelled so that users can discriminate between them. A text link is more favourable to a graphic link considering that graphics take longer to download and do not change colour after being selected (Bailey et al., 2000).

A corporate logo is a form of identity (branding) and may also serve as a sub-conscience navigational aid for users (O'Brien, 2000). Users have a sense of location which allows them to confirm where they are— have I left the site? The logo also serves as a reinforcement of the quality of information that may be found on the page— this is a reputable organisation, the information is likely to be truthful. A logo can also be used as a navigational aid which allows a user return to the HOME page— I can go back to the corporate HOME if I get lost. Links that lead to dead ends (the dreaded "error 404. The page cannot be displayed") are a consequence of poor web page maintenance a concept that Nielsen (2000) refers to as *linkrot*.

Links should always be active or be removed to reduce user frustration and the back button should not be relied upon as the primary source of assistance in returning to previous pages.

Information Architecture

Information architecture refers to the way that information is effectively and successfully presented on a web page (Davenport, 1997; Wurman, 1996). Aspects of displaying information online include the positioning and presentation of text on the screen, page scrolling, text size, font variation, margins and white space (Schriver, 1997).

Positioning dark text on a white background appears to increase the legibility of text when compared to other combinations of background colour and text (Spencer, 1969). Schriver (1997) indicates that keeping within the same font family enhances on-line legibility and that no more than two different font types should be used for on-line presentation.

Reading practices in the Western world are orchestrated around a left to right and up-down prospective. Web page design should attempt to mimic the vertical prospective that the human eye is accustomed to when reading text (Lynch & Horton, 1999). Thus, horizontal scrolling of a page is counter to normal visual reading behaviour and is not a good design practice. This also highlights another important issue, the role of culture in information presentation and the need to consider the prospective audience.

Sentence length is also important and can be a significant factor in influencing reading rate, however it appears that comprehension is unaffected by line length (Dyson & Kipping, 1999). It has been shown that users find it difficult to read edge to edge on a screen and that readers experience eye strain, and have difficulty discerning the start of new lines – more often loosing their point of reference (Schriver, 1997). Thus, text on web pages should occupy a central location and should be sufficiently indented to prevent text running edge to edge. Horton (1994) advocates that the optimum length of screen line length should be no more than 40 characters and line lengths of less than 20 characters have been found to affect the visual and spatial association between words leading to a reduction in legibility. Dyson and Kipping's (1999) research suggests that line lengths of about 100 characters are read faster than shorter lines, however the longer line length is more difficult

to read. These authors advocate 55 characters per line as optimum web page line length.

Because reading from an electronic screen is slower and more tiring than reading text on paper, sentence length and reduced word counts on a web page have led to people scanning for key words in order to find relevant information (Nielsen, 2000). Morkes and Nielsen (1997) observed that people scan text on the screen moving to deeper levels of the information content as they require. A consequence of this *scanning and drill-down* behaviour is that many users do not like long pages. For instance Black (1997, p. 53) states that 75% of people only ever read the top of a web page and never scroll. Web page content should be such so as to increase in volume as one navigates *into* the website. Hierarchical navigation should be utilised with each tier encountered containing more information as users seek out further resources about a particular area of interest (Nielsen, 2000). Users should be able to move from page to page by selecting links (paging) without always scrolling to important information. This is particularly true for home pages and menu pages where users fail to scroll past the first page when they reach a site unless the information is relevant and useful— thus, page scroll should be kept to a minimum (Dyson & Kipping, 1999).

Web Page Download

Excessive download times is problem that has been encountered by web users for many years and shows little sign of diminishing (Nah, 2000). Several studies indicate that fast web page download is the definitive feature that determines the success of a website and that users will not wait more than 10 seconds for a page to download using a 28.8kbps modem (Nielsen, 2000; Pockley, 1998; Spool et al., 1997). Others suggest that it is not unreasonable to expect a page to load in less than 8 seconds with a 56kbps modem (O'Brien, 2000). Graphics, artwork and images constitute the web page components that determine the relative speed of page delivery. A web page that includes a large number of graphic files will take a relatively long time to download to reach a user. In a restrictive bandwidth environment, where many users operate with modem speeds of no greater than 28kbps even though they have a 56kb modem— file size becomes critical for fast download. Consequently good web design should aim at building web pages that will download sufficiently fast enough to meet the expectations of the majority of users of that website.

Good Practice Recommendations for Presenting Web Information

Navigation
- All links must be coloured blue and underlined; visited links should be purple
- All links need to be active (avoid *linkrot*)
- It is preferable to use text rather than image links
- All web pages must have some form of navigation cue
- Position important links higher up on web pages
- Deeply nested hierarchical sites should let users know their location by using, for example, a bread crumb trail
- Each page should allow the visitor to return to the Home page

Information Architecture
- Use a dark text on a white or lighter background
- No more than two different font types should be used.
- In pages aimed at a Western culture audience use a left to right and vertical perspective in page layout
- Text on web pages should occupy a central location
- Line length should be between 40-60 characters
- Keep page scroll to a minimum (1-2 pages)
- Horizontal scrolling of pages should be avoided

Web Page Download
- Balance download time against the value of information content.
- Aim at download times of no more than 10 seconds with a 28kbps modem and 8 seconds with a 56kbps connection.

CONCLUSION

This paper has discussed and proposed some good practice guidelines for website design and development that need to be part of the skill set that e-commerce builders need to acquire or at least have awareness. The web design features discusses are the more subjective features associated with web design and hence are more prone to being inadvertently misunderstood and misused by developers. This paper is a starting point for discussion of an important and critical area of website development that is often ignored or poorly explained. Good web design practices are constantly evolving and are by no means complete. Future website interface design will need to address issues associated with the next generation of e-commerce applications – for example the use of the PDA, mobile telephones, Web TV and other Internet devices for delivering e-commerce services (See for example Holzschlag, 2000).

BIBLIOGRAPHY

Alexander, J., & Tate, M. A. (1999). *Checklist for an Informational Web Page, Wolfgram Memorial Library Information Gateway*. Retrieved 30/3/2002, from Available: http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/inform.htm

Bailey, R. W., Koyani, S., & Nall, J. (2000). *Usability Testing of Several Health Information Web Sites: Technical Report*: US National Cancer Institute.

Berkman, R. I. (1998). *Finding Business Research on the Internet: A Guide to the Web's Most Valuable Resources*. New York: Find/SVP.

Black, R. (1997). *Web Sites that Work*. San Jose, CA.: Adobe Press.

Brody, F. (1996). Interactive Design: State of the Art and Future Developments: An Argument for Information Design. In N. Brody (Ed.), *Multimedia Graphics* (pp. pp. 16-19). London: Thames & Hudson.

Cavanagh, L. (1999). Web Secrets: Learning From Past Successes: Seybold Report on Internet Publishing. *Desktop, 138*, p. 64-66.

Davenport, T. H. (1997). *Information Ecology: Mastering the Information and Knowledge Environment*. New York: Oxford University Press.

Dyson, M. C., & Kipping, G. J. (1999). *An Experimental Investigation on the Effect of Line Length and Number of Columns on Reading Performance*. Retrieved 31/3/2002, from Available: http://www.rdg.ac.uk/AcaDepts/lt/main/resea/fund/proj/line.html

Fisher, J. (1999). Trading Electronically: it really does matter who designs your website. In S. Lee (Ed.), *Preparing for the Global Economy of the New Millennium: Proceedings of the Pan Pacific Conference XVI, May 31-June 2* (pp. 202-214). Suva, Fiji: Pan Pacific Business Association.

Fuccella, J., & Pizzolato, J. (1999). *Internetworking: Separating Content from Visuals in Web Site Design*: Internet Technical Group: Sandia Corporation.

Gordon-Murnane, L. (1999). Evaluating Net Evaluators. *Searcher, 7*(2), p. 57.

Grassian, E. (1998). *Thinking Critically About World Wide Web Resources*. Retrieved 30/3/2002, from Available: http://www.library.ucla.edu/libraries/college/instruct/web/critical.htm

Holzschlag, M. E. (2000). I Want My WebTV. *Web Techniques, 5*(3), 34-37.

Horton, W. (1994). *Designing and Writing On-line Documentation: Hypermedia for Self Supporting Products*. New York: Wiley.

internet.au. (2002). Interview: Jakob Nielsen. *internet.au*(84), 26-28.

Lynch, P. J., & Horton, S. (1999). *Web Style Guide*. Boston: Yale University Press.

Morkes, J., & Nielson, J. (1997). *Concise, Scannable and Objective: How to Write for the Web*. Retrieved 31/3/2002, 2002, from [Available] http://www.useit.com/papers/webwriting/writing.html

Nah, F. H. (2000, 21-25 May 2000). *A Study of Web Users' Waiting Time*. Paper presented at the Proceedings of the 11th Information Resources Management Association (IRMA) International Conference, Alaska, USA.

Nielsen, J. (2000). *Designing Web Usability: The Practice of Simplicity*. New York: New Riders Publishing.

Norman, D. A. (1998). *The Invisible Computer*. Boston: MIT Press.

O'Brien, T. (2000). *E-commerce Handbook: A Practical Guide to Successful e-business Strategy*. Melbourne: Tri-Obi Productions.

Phillips, M. (1998, March 2001). *Critical Evaluation of Resources.* Retrieved 27 September 2002, 2002, from http://www.lib.berkeley.edu/TeachingLib/Guides/Evaluation.html

Pockley, S. (1998). *RMIT Web Site Review*. Melbourne: RMIT.

Powell, T. A. (2000). *Web Design: the complete reference*. Berkeley: Osborne/McGraw-Hill.

Schneidermann, B. (1999). *Readings in Information Visualisation: Using Vision to Think*. New York: Morgan Kaufmann.

Schriver, K. A. (1997). *Dynamics in Document Design: Creating Text for Readers*. New York: John Wiley & Sons.

Sellitto, C. (2001a, 20-24 May 2001). *Evaluation of the Quality of Medical Information on the Web: An Overview of the Current Assessment Frameworks*. Paper presented at the Proceedings of the 12th Information Resources Management Association (IRMA) International Conference, Toronto, Canada.

Sellitto, C. (2002). The Quality of Medical Information on the Internet: Some Current Evaluation Frameworks. In A. Armoni (Ed.), *Effective Healthcare Information Systems* (pp. p. 1091-1095). Hershey, PA: IRM press.

Sellitto, C., & Wenn, A. (2000, 30 November - 1 December 2000). *Web Site Design: Emerging Standards for Business.* Paper presented at the Proceedings of the 1st Working for e-Business Conference: Challenge for the New Economy, Perth, Western Australia.

Small, R. V., & Arnone, M. P. (1999). Evaluating Web Resources With Young Children: Information Literacy New Instructional Models. *Library Talk, 12*(3), p. 14.

Spencer, H. (1969). *The Visible Word* (2nd ed.). New York: Hosting House.

Spool, J. M., Scanlon, T., Schroeder, W., Snyder, C., & DeAngelo, T. (1997). *Web Site Usability: A Designer's Guide*. North Andover, MA: User Interface Engineering.

Wenn, A., & Sellitto, C. (2001). Emerging Technical Standards: towards an identification of the skills sets needed by website developers. In A. Wenn (Ed.), *Skill Sets for the E-commerce Professional: Proceedings of SSECP 2001* (pp. 101-110). Melbourne: Victoria University of Technology.

Wurman, R. S. (1996). *Information Architects*. New York: Graphics Press.