

# Usability Issues in Web Site Design

**Nigel Bevan**

National Physical Laboratory, Usability Services, Teddington, Middx, TW11 0LW, UK  
email: [Nigel.Bevan@npl.co.uk](mailto:Nigel.Bevan@npl.co.uk)

## ABSTRACT

Unless a web site meets the needs of the intended users it will not meet the needs of the organisation providing the web site. Web site development should be user-centred, evaluating the evolving design against user requirements. The first step is to define the business objectives, the intended context of use and key scenarios of use. This helps prioritise design and provides a focus for evaluation. The design should take account of established guidelines for web writing style, navigation and page design. The site structure and page design should be evaluated by representative end users. Management and maintenance is important to maintain usability.

## INTRODUCTION

Why are so many web sites frustratingly slow and difficult to use? The reasons include:

- Organisations often produce web sites with a content and structure which mirrors the internal concerns of the organisation rather than the needs of the users of the site.
- Web sites frequently contain material which would be appropriate in a printed form, but needs to be adapted for presentation on the web.
- Producing web pages is apparently so easy that it may not be subject to the same quality criteria that are used for more traditional forms of publishing.

In short, web sites provide a unique opportunity for inexperienced information providers to create a new generation of difficult to use systems! Successful web development requires the combined skills of domain expertise, HTML, graphic design and web usability.

A web site will not meet the needs of the organisation providing the site unless it meets the needs of the intended users, and provides "quality in use"<sup>1</sup>. Limited web sites are seen as a sign of corporate incompetence<sup>2</sup>. To implement a web site which users find effective, efficient and satisfying requires a user centred design process<sup>3</sup>. This paper describes a process which integrates existing empirical evidence and guidelines for web site design into a user-centred process which is consistent with ISO 13407<sup>4</sup>. Due to limitations of space, the reader is referred to the references for more details of the individual design guidelines.

It is essential first to define the business objectives and usability goals, and to specify the intended contexts of use<sup>5</sup>. These should drive an iterative process of design and evaluation, starting with partial mock-ups and moving to functional prototypes. Continued usability requires subsequent management and maintenance.

## PLANNING

### Define the business objectives of the site (provider requirements)

- What are the main purposes of the site? These could include disseminating information, advertising services, selling products, positioning in the market or demonstrating competency.
- Who do you want to visit the site, is it internet or intranet - what are the important user categories and what are their motivations and goals?
- What type of pages and information will attract users and meet their needs? e.g. hierarchically structured information, a database, download of software/files, incentives to explore the site.
- What are the quality and usability goals which can be evaluated? e.g. to demonstrate superiority of the organisation to the competition, appropriateness of the web site to user's needs, professionalism of the web site, percentage of

users who can find the information they need, ease with which users can locate information, number of accesses to key pages, percentage of users visiting the site who access key pages.

- What is the budget for achieving these goals for different parts of the site?

Identify responsibilities for achieving quality and usability objectives, and estimate the resources and budget for these activities.

### **Specify in detail the intended contexts of use (user requirements)**

- Who are the important users?
- What is their purpose for accessing the site?
- How frequently will they visit the site?
- What experience and expertise do they have?
- What nationality are they? Can they read English?
- What type of information are they looking for?
- How will they want to use the information: read it on the screen, print it or download it?
- What type of browsers will they use? How fast will their communication links be?
- How large a screen/window will they use, with how many colours?

Even if there is no definitive answer to these questions, it is important to obtain agreement on the assumptions which are made.

### **Define key scenarios of use**

- Describe specific examples of people accessing the site, and what they want to achieve. These will help prioritise design, and should be the focus for evaluation.
- Also identify any niche markets and interests which can be supported by the site without major additional investment (e.g. specialised information, access by users with special needs).

## **SITE STRUCTURE AND CONTENT**

- Structure information so that it is meaningful to the user. A structure which makes sense to the user will often differ from the structure used internally by the data provider. Different user groups may need different interfaces.
- What information content does the user need at what level of detail? Use terminology familiar to the user.
- Interview users to establish the users' terminology and how they categorise information.
- Produce a card (or sticky note) for each anticipated page for the site, and use card sorting techniques to design an appropriate structure<sup>6</sup>.

### **Writing style**

People rarely read web pages word by word - they scan pages to find the information they want<sup>7</sup>.

- Make the text scannable with bulleted lists, highlighted keywords, meaningful headings and short sections of text<sup>8</sup>.
- Start with the conclusion, then provide the details<sup>8</sup>.
- Make text concise and objective: avoid marketing exaggeration, subjective claims or boasting<sup>8</sup>.
- Do not include unnecessary "white space" as this impedes scanning the text<sup>9</sup>.
- Do not expect users to read large amounts of text on-line: provide one large page for printing or a file to download.

## **SUPPORT NAVIGATION**

### **Help users find their way<sup>10</sup>**

- Show users where they are and where they can go.
- Use a consistent page layout.
- The easiest to navigate information pages have a high density of self-explanatory text links<sup>9</sup>.

- Minimise the number of clicks needed to reach final content: try to make sure users can get to useful information in no more than four clicks<sup>11</sup>.
- Users do not mind scrolling pages if necessary, but beware of pages which appear complete on a small screen while hiding important buttons or links just off the bottom.
- Provide links on each page to a list of the local contents, a site map and home<sup>11</sup>.
- On larger sites consider providing a search facility – many users habitually use search rather than exploring a site<sup>9</sup>.
- Provide a simple interface to the search engine<sup>12</sup> and check that it gives easily understood results<sup>9</sup>. Most current search engines are so poor that their use reduces the likelihood of finding relevant information!
- Include navigational buttons at both the top and bottom of the page – this minimises the need for scrolling.
- Use URLs which are meaningful and exclusively lower case – this helps people who have to type them in.
- URLs quoted in printed material should be short and simple to type: if necessary use aliases rather than the full URLs.
- Use page titles which make meaningful bookmarks (do not start titles with “Welcome to ...” or use generic titles such as “Contents”).
- Avoid dead ends – plan that any page could be the first page for users reaching the site from a search engine.

### **Tell users what to expect<sup>13</sup>**

- Avoid concise menus: explain what each link contains – so that users can find the right link first time.
- Provide link titles<sup>14</sup> – they simplify navigation for users with recent browsers which support this feature.
- List the contents of each part of the site as a list of links to the final information, divided into meaningfully titled groups<sup>15</sup>.
- Provide a site map or overview – this helps users understand the scope of the site.
- Distinguish between a contents list for a page (e.g. use a heading “Page contents”), links to other pages, and links to other sites (e.g. using icons for off-site links).
- Do not change default link colours and style – otherwise some users may not recognise the links.
- Give sizes of files which can be downloaded.

### **Highlight important links**

- The wording of links embedded in text should help users scan the contents of a page, and give prominence to links to key pages. (Highlight the topic - do not use “click here”!)
- To keep users on your site, differentiate between on-site and off-site links.

## **PAGE DESIGN**

### **Design an effective home page**

- This should establish the site identity and give a clear overview of the content.
- The important information should fit on one screen, as some users will not bother to scroll the home page<sup>16</sup>.

### **Design for efficiency<sup>17</sup>**

- It is important to minimise the download time as most web users have slow connections<sup>18</sup>.
- Graphics add interest but are slow to load and can impede navigation.
- Use the minimum number of colours to reduce the size of graphics.
- Use the ALT tag to describe graphics, as many users do not wait for graphics to load.
- Use small images, use interlaced images, repeat images where possible<sup>19,20</sup>.

### **Make text easy to read and use**

- Avoid the use of flashing or animation, as users find this very distracting.
- Avoid patterned backgrounds, as these make text difficult to read.
- Where possible use tables instead of frames<sup>21</sup> – frames can interfere with printing and bookmarking.

### **Support different browser environments**

- Test that your pages format correctly using the required browsers and platforms.
- Check that pages containing reference information or large amounts of text print correctly on the required browsers, platforms and paper sizes (note that European A4 paper is narrower and longer than US letter size paper<sup>22</sup>).

### **Provide support for text-only browsers**

Some users turn off graphics to increase speed, and the visually impaired use text only browsers:

- To support text only browsers, use a logical hierarchy of headings, avoid frames and use ALT tags which describe the function of images<sup>23</sup>.

## **EVALUATION METHODS**

### **Expert inspection**

- Use a checklist to inspect pages for conformance with house style (consistency of layout) and with recommendations such as those in this paper.

### **Early mock-ups**

- Early in design evaluate a partial mock up of the site with representative users performing representative tasks. Use first drafts of screens, either on-line or as colour prints<sup>24</sup>.

### **Functional prototypes**

- Produce a working version of a representative part of the site, taking account of the design principles and evaluation feedback.
- Evaluate the working version with representative users performing representative tasks<sup>25</sup>.

## **MANAGEMENT AND MAINTENANCE**

### **Ensure that new pages meet the quality and usability requirements**

- What skills will be required of page developers? Do they have the necessary expertise in the subject domain, HTML, graphic design and usability? Do they need training?
- What will be the criteria for approval of new pages? Is some automated checking possible?

### **Indexing**

Help people to find your site by indexing the important topics and names of key people. To facilitate indexing by search engines:

- Provide search topics using the META tag<sup>26</sup> in the page heading.
- Include the main search topics in the first few lines of text on the home page.
- Fill in the submission forms for search engines.
- Consider using an automated submission tool (e.g.<sup>27</sup>).

### **Maintenance**

Plan and review the site structure as it grows, review the user needs, and make sure the site continues to meet the needs.

- Monitor feedback from users.

- Monitor the words used when searching the site.
- Monitor where people first arrive on the site, and support these pages as entry points.
- Check for broken links (e.g. using SiteMill or HotMetalPro).
- Compare your site to other comparable sites as web browsers and web design evolve.

As it is unlikely to be economic to test the usability of every page, it is important to establish a sound structure and style guide within which new pages can be developed, and for page developers to be aware of the business objectives and intended contexts of use.

## **ACKNOWLEDGEMENTS**

This paper is a revised version of <sup>28,29</sup> and was developed with the support of the EC INUSE<sup>30</sup> and RESPECT<sup>31</sup> projects. It draws on information from the web sites and publications listed below, and incorporates review comments by Ian Curson.

## REFERENCES

A version of this paper with live links can be found at <http://www.npl.co.uk/npl/sections/us>.

- <sup>1</sup> Bevan N (1997) Quality and usability: a new framework. In: *Achieving software product quality*, van Veenendaal, E, and McMullan, J (eds) Tutein Nolthenius, Netherlands
- <sup>2</sup> <http://www.useit.com/alertbox/9712a.html>
- <sup>3</sup> Bevan N and Azuma M (1997) Quality in use: Incorporating human factors into the software engineering lifecycle. In: *Proceedings of the Third IEEE International Software Engineering Standards Symposium and Forum (ISESS'97)*, p169-179.
- <sup>4</sup> ISO FDIS 13407 (1998) Human centred design process for interactive systems.
- <sup>5</sup> Bevan N, Macleod M (1994) Usability measurement in context. *Behaviour and Information Technology*, **13**, 132-145.
- <sup>6</sup> <http://www.sun.com/sun-on-net/uidesign/cardsort.html>
- <sup>7</sup> <http://www.useit.com/alertbox/9710a.html>
- <sup>8</sup> <http://www.useit.com/papers/webwriting/writing.html>
- <sup>9</sup> Spool JM et al (1997) Web site usability: A designers guide. User Inteface Engineering, North Andover, USA.
- <sup>10</sup> <http://applenet.apple.com/hi/web/find.html>
- <sup>11</sup> <http://www6.ntlabs.com/HyperNews/get/PAPER180.html>
- <sup>12</sup> for example <http://www.metacrawler.com> has three simple options when searching for multiple words: 'any', 'all' or 'phrase'
- <sup>13</sup> <http://applenet.apple.com/hi/web/tell.html>
- <sup>14</sup> <http://www.useit.com/alertbox/980111.html>
- <sup>15</sup> UIEtips 3/20/98. Jared Spool, User Interface Engineering (uie@uie.com)
- <sup>16</sup> <http://www.useit.com/alertbox/9712a.html>
- <sup>17</sup> <http://www.useit.com/alertbox/9703a.html>
- <sup>18</sup> <http://www.useit.com/alertbox/980405.html>
- <sup>19</sup> <http://www.pantos.org/atw/35247.html>
- <sup>20</sup> <http://www.pantos.org/atw/35273.html>
- <sup>21</sup> <http://www.useit.com/alertbox/9612.html>
- <sup>22</sup> <ftp://ftp.ietf.org/internet-drafts/draft-palme-int-print-03.txt>
- <sup>23</sup> <http://www.useit.com/alertbox/9610.html>
- <sup>24</sup> <http://www.sun.com/sun-on-net/uidesign/papertest.html>
- <sup>25</sup> <http://www.sun.com/sun-on-net/uidesign/screentest.html>
- <sup>26</sup> <http://users.abac.com/cgi-bin/drclue/F1.cgi/HTML/META/META.html>
- <sup>27</sup> <http://www.exploit.net/wizard/index.html>
- <sup>28</sup> Bevan N (1997) Usability Issues in Web Site Design. In: *Proceedings of HCI International'97, San Francisco, 24-30 August 1997*.
- <sup>29</sup> Bevan N (1998) Usability Issues in Web Site Design. In: *Proceedings of UPA'98, Washington DC, 23-26 June, 1998*.
- <sup>30</sup> <http://www.npl.co.uk/inuse>

---

<sup>31</sup> <http://www.npl.co.uk/respect>