

Web Design – the New Challenge of Designing Information for Distribution on the World Wide Web

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The Web is an entirely new medium that demands a new approach to design. The development of Web based products requires the solving of new problems and new issues. With the recent commercialisation of the Web these problems and issues have become more pressing and the search for solutions is now being conducted in the commercial world as well as in the universities.

Here we introduce the design of Web based information from a practical viewpoint and examine one of the many new issues that play a role in Web design: the structuring of the information.

1. INTRODUCTION

In 1945 'hypertext' was first introduced by Vannevar Bush as a new concept. Technology only caught up with the idea in the 70s and 80s when hypertext systems emerged as an interesting research area, but large scale development and research in the area was hampered by the lack of a general, widely-used and easy to implement hypertext system (only HyperCard came the closest). However the last two years have seen an incredible increase in the use of hypertext in the form of the Web. Implementing hypertext and hypermedia systems is now well and truly out of the lab and into the outside world. This was brought home to me last month when I was given a lift by a taxi driver who was busy designing his own home page on the Web.

The Internet and the Web have provided a global platform for hypertext and hypermedia information. The impetus given by this development, and the ability of the Internet to capture popular attention has resulted in a huge increase in hypermedia information. The audience is expanding. The amount

of information available on the Web is expanding, and finally the medium itself is becoming more mature, supporting more possibilities for layout, animation and interaction.

To some extent the new commercial focus on the Web has overtaken the work done in hypermedia research in the academic institutes. It is not that the commercial world is now leaving the research world behind, it is such that it has reached a position where it needs research more than ever, as problems in the design of Web sites require more general and structural solutions.

2. OLD AND NEW DESIGN

In the early days of hypertext, design played a very small role in the structuring of the information. The information was essentially text only and the only variable that the design could work with was the building of links.

With the Web came the step from hypertext to hypermedia and multimedia design. Designing a Web site was more similar to designing a CD-i or a CD-ROM. As such it requires a variety of different design disciplines. These can be divided into three groups.

2.1. Conventional graphic design

Since the layout of individual pages within a Web document involves conventional elements of style conventional graphic design plays a role. However with HTML this conventional approach to design must be modified since the designer does not have control over all the conventional aspects of page layout. In particular the choice of fonts and the exact dimensions of the page. The usual questions asked by graphic designers such as 'what font styles can I use?' and 'how big is a page' have to be answered with 'none' and 'you can never tell'.

2.2. User interface design

As well as conventional graphic design, the interactive nature of the medium means that certain elements of user interface design play a role. These include the key concepts like:

Providing feedback to the user for the actions they are carrying out.

Giving the user visual cues about the functionality of different areas of the page (what is a title, what is a button, what is information, what is decoration)

Supporting the user throughout a dialogue, (for example, if they are ordering from an on-line catalogue, giving them a 'shopping list' functionality so that they can see all along what they have chosen and how much it all costs, and a safe ordering.

2.3. New design areas

There is also a collection of new topics that play a role connected with the new possibilities of the medium; structuring information, navigation, extracting information from companies, supporting dynamic sites, automatic generation of pages.

Below we will examine one of these issues; site structuring.

3. STRUCTURING INFORMATION

Structuring a homepage composed of a few separate documents is a trivial task. Structuring a large site is a lot more involved, especially one representing the activities of an international company and incorporating information sources, catalogues and entertainment elements. In practice there are no methodologies for designing hypermedia, it is possible to extract a collection of general guidelines from practical experience. Consider the following.

3.1. The structure must be comprehensible to the user

Partly this depends on choosing a structure that is easy to comprehend for the user, but there is also an element of graphic design, supporting the users comprehension of the structure by use of good labelling and titling and reliance on contextual feedback such as colour and style

3.2. The structure must reflect the differing nature of the material

Within a Web site there is much material present of differing natures. This information can differ with respect to time; some of the information is highly dynamic, changing daily or hourly while other information hardly changes at all. The information can also differ with respect to detail, some is detailed paragraphs of text while other information is telegram style overviews or summaries of information.

The differing natures of the information is important to the user and as such the structure should go some way to indicating what the nature is, areas of information of the same nature should be clearly grouped together to indicate the similarity in nature. That way regular visitors to the site can immediately make their way to the new information without having to read things that they may have already seen several times before, also readers having a quick browse will not be confronted with huge blocks of text and vice versa.

3.3. The structure must follow the implicit structure in the information

Information has its own logical structure with respect to sections, order and structure. This should be mirrored in the organisation of the information on the Web site. A common example of this is the question of splitting or scrolling. Should information be offered as one huge file through which the user must scroll or should it be split up into small pages (hyper-bites) through which the user must click (next page... next page...). The answer is that it depends on the inherent structure of the material. If it is one sequential structure with no definite sections and a logical build up of information then a large scrolled document is appropriate, if however it is a collection of information with no definite sequential nature and the user will not need to read it all in order then it would be better to divide it up into logical chunks.

3.4. The availability of links within the structure must match the readers requirements

Once the structure is decided upon, there is then the question of links to allow the user to navigate through the material. The choice of where these links should be within the structure is to a great extent answered by a consideration of the sort of tasks that the user will be doing. Will they be reading a collection of chunks of information sequentially or will they be dipping into the collection in a nonlinear way, the former requires a forward/backward approach to linking, the latter an overview, with documented links into the material.

3.5. The information must be homogenous throughout the site

You should avoid the situation where the site is devoid of information until the user reaches the outer leaves of the structure, users will have the feeling that they are doing a lot of deciding, choosing and clicking before they actually reach any useful information. Likewise, attempting to fit all the information into the high-levels of the structure results in an unclear organisation of the information.

3.6. Where possible standard recognised structures should be used

A book always has the index at the back and the table of contents at the front. A film has the main titles at the beginning and a complete list of titles at the end. Each existing medium has its own recognised conventions for structuring the information, sometimes with an obvious reasoning behind the choice and sometimes just because everyone else does it in that way. A similar thing is happening with the way people

structure Web sites. The standards and rules of thumb for the coming generations are being established today.

A good Web designer should be aware of what is happening in the medium (as should any designer). They should not copy blindly but should alter and reuse ideas in a constructive and meditated manner. They should also try and escape from the constant use of the tree structure. Other structures are emerging and should be given a chance; chains, chains with overviews, loops etc.

3.7. External perceptible structure is better than internal structure

Many companies have a well defined structure to their organisation, this structure governs the flow of information within the company the responsibilities for different tasks, the hierarchical command structure. This structure is so much a part of their thinking that it can sometimes dominate the structuring and presentation of information on the Web for purely public consumption. Such structuring of information for public consumption should be dominated by the public's perceived structure of the information. Thus if you were designing a Web site for a publisher the site should not be organised according to the different divisions within the company but according to the different subjects covered by the published material.

3.8. Look to the real world for examples of structure

Above I stated that Web designers should be aware of the trends in information structuring on the Web. For a richer source of information structuring ideas they should also develop a good awareness of abstract information structuring in the world around them. How is the information in a book shop organised? On a poster? In a city guide? A user manual? From their observations they should try and extract general ideas about information structuring and attempt to apply these to their Web design work.

4. QUESTIONS FROM PRACTICAL WEB DESIGN

As well the emergence of guidelines there are also questions that appear repeatedly in the practice.

4.1. Explicit and implicit structure

Often, providing the user with a graphical representation of the structure (a sort of abstract map) is put forward as a good idea. But do

users have a definite structural model of the information they are navigating, or is the navigation carried out in some other manner more dependent upon contextual cues such as colour and style?

4.2. Meta information for links

A link to another piece of information can inform the user before they click on it. It can give them an idea of the subject matter that lies behind the link, the type of media it is and the approximate size of the information. Presenting this sort of information for each link would give the user good feedback before they clicked, but it would also interfere with the readability of the document. Would people find this sort of information useful or not and are there ways of presenting the information that don't upset the smooth reading of the document?

4.3. Automatic parsing of structure

Imagine I have a collection of information, is there any way of automatically selecting the best structure to present the information? Or, on a less ambitious level, could a high level specification language be developed to define the required structure without tedious programming of links and overviews by hand?

4.4. A good Web notation

Specifying a Web site on paper is difficult. Some people use long lists of numbered items resulting in a document that looks good but that makes it very difficult to get any idea of the overall structure. Graphic connected graph representations quickly become unwieldy, it is difficult to show the content and structure in the same diagram and cross-links can leave the whole thing looking incredibly complex.

Furthermore, a simple conceptual idea such as having the site in more than one language results in an extra level of complexity that bears little resemblance to the simplicity of the concept. Consider if each page was in three different language with the ability to switch between them at any point in the structure.

Is there a good notation or must Web designers always work with a variety of different specification styles?

5. CONCLUSION

This is a new area, as such there are not yet any formal design methods for structuring information. However the emergence of guidelines such as those above from the world of design practice serves as a base from

which to carry out research. It also serves as a rough way to measure formal methodologies since any formal methodology developed in the future will have to encompass the points listed above.

The key to the area is a better understanding of the relationship between people and structure. To some extent the investigation of this relationship can be greatly supported by the Web. It is a medium with a high level of exposure and the ability to automatically extract information about its use through the automatic logging of statistics. The Web is in effect a ready made lab with access to a huge group of test subjects. Tapping this resource is vital to understanding peoples use of Web based information.

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As We May Think, Vannevar Bush, *interactions*, vol. 3, no. 2, May 1996, pp 35-46.
It is also available online at several places, such as
<http://www.isg.sfu.ca/~duchier/misc/vbush/> .
2. General information regarding Web design is limited but growing. An early treatment of designing a large scale commercial Web site can be found in:
Blazing the Trail. J. Nabkel and E. Shafrir. *SIGCHI Bulletin*, vol. 27 no. 1. January 1995. Pages 45-54.
3. The Web site discussed in this article is at: www.hp.com
4. For a general and more rigorous consideration of the design issues of hypermedia the reader is referred to:
Designing Hypermedia Applications. M. Bieber, T. Isakowitz (editors). *Communications of the ACM*, vol. 38 no. 8. August 1995. Pages 26-112.
5. These articles are also available in hypertext form on the Web at:
www.acm.org/siglink
6. Another Web resource in this area is ERCIM's World Wide Web Working Group. A recent meeting relevant to this paper was the International WWW Workshop on Design and Electronic Publishing

and the position papers from the participants illuminate interesting problems and ideas:

www.cwi.nl/ERCIM/W4G/