Actas da I Conferência Internacional

de Tecnologias de Informação e Comunicação na Educação

desafios'99
challenges'99

Organizadores

Paulo Dias

Cândido Varela de Freitas

Centro de Competência Nónio Século XXI

da Universidade do Minho

1999

FICHA TÉCNICA

Título
DESAFIOS'99
CHALLENGES'99

Oganização
PAULO MARIA BASTOS DA SILVA DIAS
CÂNDIDO VARELA DE FREITAS

Capa, Execução, Orientação Gráfica e Fotocomposição
TEKNODESIGN

Impressão e Acabamentos
LUSOGRAFE

Depósito Legal
145680/99

ISBN
972-98456-0-3

500 Exemplares
Braga — 1999

Apoio à publicação
Instituto de Inovação Educacional
Fundação Calouste Gulbenkian

ÍNDICE

DESIGNING NAVIGATION TOOLS FOR THE WEB

Ana Paula Sousa CORREIA — Universidade do Minho, Portugal
Paulo DIAS — Universidade do Minho, Portugal

This paper intends to present two of the more common navigation metaphors (the book and the spatial metaphor) used in the World Wide Web and to discuss their efficiency as mechanisms to prevent disorientation. To adapt these metaphors to promote orientation in the Web is not an easy or a consensual task and there is some controversy in relation this theme.

1. Disorientation can be a problem

The Internet and its associated environments (World Wide Web, gophers) are viewed more as information space than as shared computational resources. This was responsible for the emergence of a new kind of "space", the cyberspace that can be described as an electronic territory. But navigating in such a space can be very confusing specially when the users are novices or do not have a clear objective to drive them during the browsing process. Navigation tools as "previous" and "next" buttons are basic forms but there are more tools such as maps, book/landmarks and history lists. The most sophisticated mechanisms to navigate through the Web are the Web search engines such as Alta Vista, Infoseek, Excite, Webcrawler, Lycos, HotBot and the Yahoo Directory (Barlow, 1998). They all aim at orienting whoever is browsing in the information in order to help them find what they need, so that they can move on to their next task.

The non-linear principle, which is the most important feature of the hypertext, is the basis for World Wide Web (WWW). One breakthrough in this new medium is the linking together of information nodes as a true hypertext.

However hypertext creates a contradiction: links to other sources add depth to a Web site, but it can also send the readers away mid-sentence and mid-thought by encouraging them to click somewhere else and thus creating a great confusion in their minds. On the contrary, when we read a book we can hold it and touch it and we also have several visual and tactile cues about the information it offers us. They are called discourse cues and consist in aspects such as: organization into chapters and sections, conventions concerning the placement of topic sentences, and typographical conventions that help the reader decide which parts to read in detail, and which parts to skim over (Kim & Hirtle, 1995). Such conventions have not been established in hypermedia environments yet. The user have to make all sort of meta-decisions concerning what to jump next without the help of a set of established discoursive conventions (Gygi, 1990). This situation grows worse in the cyberspace where the quantity of information and the number of links among the nodes of information can be almost uncountable.

Conklin's (1987:38) original statement concerning the problems with hypertext refers two factors:

— "disorientation" as the difficulty to know "(1) where you are in the network and (2) how to get to some other place that you know (or think) exists in the network ";

— "cognitive overhead" as "the additional effort and concentration necessary to maintain several tasks or trails at one time".

Feeling lost, not knowing where to go, not knowing where we are, and finding difficult to select the next node of information, these are some of the problems the users must face each time they interact with a hypermedia system. This "disorientation feeling" is bound to cause frustration, since decisions about the node or sequence of nodes to be explored are difficult to make in complex environments (Dias, Gomes & Correia, in press).

To this scenario we can add, if we are referring to the Web, the absence of physical context, the increasing need for graphical context cues and the variety of ways a user can arrive to any page of the Web.

Looking for a solution for the navigation problems while exploring the cyberspace may lead us into a multiplicity of solutions or hypothetical solutions all very different, specially since their effectiveness has still to be demonstrated in most cases (Dias, Gomes & Correia, in press).

2. Using familiar contexts to the new medium

Some of the results and knowledge resulting from this early research were imported to help solving navigation problems related to the WWW.

Metaphors like the book metaphor and the space metaphor gain a new perspective, when presented in such an environment.

2.1 The book metaphor

The book metaphor has often been used to design hypermedia environments, called electronic books. An electronic book is "essentially a collection of pages of electronic information that is organised (conceptually) just like the pages of a conventional book" (Barker, 1995:2). According to Barker (1995) most electronic books use some form of graphical user interface and the quality and bandwidth of visual display within such interfaces depends enormously on the spectrum of delivery platforms available. But in almost all computer screens (until now) users read about 25% slower than on a printed book (Nielsen, 1998). Even when electronic books gain the same reading speed as printed ones, Nielsen claims that the book metaphor will still be a bad idea and justifies this statement saying that: the basic problem is that the book is too strong as a metaphor because it tends to lead designers and writers astray. "Electronic text should be based on interaction, hypertext linking, navigation, search, and connections to online services and continuous update. This new-media capabilities allow for much more powerful user experiences than a linear flow of text" (Nielsen, 1998).

However some of the terminology (for example, "page") related to the WWW reminds us of similar elements in a "book". The use of titles, headings, sentences, paragraphs, table of contents and bookmarks in the design of Web pages is very common. But we need to consider that the WWW alters the way we perceive a book or a magazine. Therefore since the computer limits the amount of information visible at any given time on a screen and as this screen depends on the individual WWW browser used as well as on the resolution of the screen, the traditional concept of page has changed. This constraint does not normally occur in text-based print media that allow the reader to leaf through a lengthy reading, and commonly two pages of text are simultaneously on view. On the other hand, magazines entice newsstand readers into their content by displaying bold, vivid images and language designed to satisfy two types of readers: (1) the ones who prefer a complete understanding of the publication focus; and (2) the others who prefer to be directly drilling down to a specific content. This balance is even more crucial on the Web, where there are no physical clues within scope: magazines and books are heavy and take up space, but Web sites do not.

Title, heading, sentences and paragraphs

The act of reading involves mind processes that transform letters into word patterns and then conceptually into sentences and paragraphs. Designing

a page, on the Web or in print, often revolves around the manipulation of these patterns. Headlines, for example, break out of the paragraph mold by altering typographic variables like font, size, and color (Veen, 1997).

Links

In order to add a layer of interactivity to a page Web designers add links by inserting color underlined scars into the patterns of the paragraphs. This can lead the reader to an overbearing distraction. As Veen (1997) said "Suddenly, the reader must decide: Do I stop here and click on to this link? Do I finish the sentence and come back? Do I finish the story and scroll back to the navigation element?". It also can be said that simply changing the color of the link will not solve the disorientation problem, it will merely make it more subtle, but still annoying.

Some sites (for example, http://www.hotwired.com/) experimented with links and moved them to the margin, which creates an annotation-like effect. A benefit to this strategy is that links can be given further context by pulling them away from body copy. The Web site for The New York Times (http://www.nytimes.com/) tried a different method - placing all links at the end of its stories.

Table of contents and indexes

A table of content is an almost universally navigation tool (Bevirt, 1996). Many users when are novice to hypertext feel more comfortable and welcome a Web site's table of contents. It lists document titles, headings and sometimes subheadings. The latter normally are not included in the table of contents because they can expand it to an undesirable length.

Frequently, a Web site's frontdoor simply displays "the top of the directories": a list of content categories that offer several options from which a user must choose. While this may work out for a content aggregator like Yahoo or Infoseek, it does not seems to offer much context t a user that just want to wander in the electronic space. In fact, "it is reminiscent of trade journals that publish each issue's table of contents on the front cover. It can be useful for loyal readers, but not for those who browse" (Veen, 1997).

2.2 The spatial metaphor

A great deal of the research relating to navigation and orientation focuses its attention on the graphic representation of hyperdocuments (Boyle & Snell, 1990). This kind of graphic representation is presented most

frequently as a navigation map, which tries to represent the topology of an hyperdocument. Underlying the use of maps to help navigation there seems to be some sort of identification between the navigation in hypertext/hypermedia systems and the navigation in physical spaces.

However there is some controversy involving the hypertext discussing whether navigation should or should not be conceived as spatial. Stanton (1994) classifies the spatial metaphor as dangerous. He bases his opinion on the electronic space definition. According to Stanton, majority of the studies done in relation to the hypermedia environment, seems to use the word "space" with the same meaning it is used by everyday-sense where it corresponds to a physical relationship between objects. In this perspective, the electronic space would be equivalent to the physical space. Stanton supports that starting from the concept of hypertext as a multidimensional space, which can be explored in various ways, "space", in this context, must be defined as "the collection of objects and activities contained within a specific domain" (Stanton, 1994:288).

Dias & Sousa (1997) claim that the electronic environments present intrinsic characteristics that do not permit a linear transfer and appropriateness of the geographical environments characteristics'. They suggest that the use of a navigation map in an electronic environment is not as efficient as the use of a map in a geographical environment.

Nevertheless, the spatial analogy seems to be so widely accepted, because: (1) majority of texts exist on the printed page, it is actually situated in the space and is currently spoken of "bringing" that text or "moving" the place of another; and also because we need (2) to assume our minds work in spatial terms, through easily recalling spatial places or falling into habits of spatialization processes when organizing ideas (Landow, 1990).

Another controversy is related to the building of the map itself. Normally, a navigation map tries to represent the topology of an hyperdocument or a Web site including the representation of the links between the information. This is based on the traditional definition of a map (from geographical contexts). On one hand, during navigation in the cyberspace the number of links can be an enormous amount and this representation is very difficult to show on a single screen for it takes plenty of room. On the other hand, it can overload the screen with a confusing display of the links between the nodes, which intersect like a puzzle. That is why some of the Site Maps presented in several Web sites do not have any kind of links' representation and are interactive lists of site-contents (for example, the IBM Software BookManager Web Site Road Map http://booksrv2.raleigh.ibm.com/homepage/ourmap.html).

The cyberspace has another interesting feature that makes it hard to map. It is infinitely mutable. All maps begin to lose their accuracy as soon as they are printed (Staple, 1995). However some attempts to design the geography of the cyberspace have been made as we can see on the Web site entitled "An Atlas of Cyberspaces" (URL: http://www.cybergeography/atlas/).

3. Final remarks

In this paper we assume that the book metaphor and the spatial metaphor can provide some help to avoid disorientation problems in the Web in spite of all the controversy that exists. Navigation tools exist to help users find needed information and to keep them from becoming confused and/or disorientated while navigating in the Web. Some remarks may be drawn that could be useful for Web designers, as follows:

— Navigation schemes must be consistent, intuitive, and highly comfortable;

— Navigation tools must be predictable: after some experience with the tools the users should understand how each tool acts (Bevirt, 1996);

— Multiple navigation tools should be offered (Bevirt, 1996; Kim & Hirtle, 1995);

— The effective organization of the information in the Web site is more important than the navigation tools. "Just a good documentation cannot save a poorly designed and implemented product, god navigation tools cannot save a disorganized Web site!" (Bevirt, 1996);

— There are some risks involved in adapting familiar cues to help navigation in the Web environments. Many cues have evolved from print media and from geographical contexts and the challenge is to adapt them in such a way that it will not be possible to forget this new medium has particularities that are unique and must be considered.

References

BARKER, P. (1995).Electronic Books: A Review and Assessment of Current Trends. Paper presented at the *Sixth World Conference on Computers in Education* (Birmingham, United Kingdom, 23-28 July, 1995).

BARLOW, L. (1998). How To Use Web Search Engines (URL: http://www.monash.com/spidap.html).

BEVIRT, B. (1996). Designing Hypertext Navigation Tools. In H. Maurer (Ed.), *WebNet 96 Proceedings Online*. San Francisco, USA: October 15-19, 1996 (URL: http://aace.virginia.edu/aace/conf/webnet/).

BOYLE, C. & SNELL, J. (1990). Intelligent navigation for semistructured hypertext documents. In Ray McAleese & Catherine Green (Eds.), *Hypertext: State of the Art*. Oxford: Intellect Limited, 28-42.

CONKLIN, J. (1987). Hypertext: An Introduction and Survey. *IEEE Computer*, 20 (9), 17-41.

DIAS, P. & SOUSA, A. (1997). Understanding Navigation and Disorientation in Hypermedia Learning Environments. *Journal of Educational Multimedia and Hypermedia*, 6 (2), 173-185.

DIAS, P., GOMES, M. & CORREIA, A. (1999). Disorientation in Hypermedia Environments: Mechanisms to support Navigation. *Journal of Educational Computing Research* (in press).

GYGI, K. (1990). Recognizing the Symptoms of Hypertext... and What to Do About It. In Brenda Laurel (Ed.), *The art of Human-Computer Interface Design*, Reading, Massachusetts: Addison-Wesley Publishing Company, 279-287.

KIM, H. & HIRTLE, S. (1995). Spatial metaphors and disorientation in hypertext browsing. *Behaviour & Information Technology*, 14, (4), 239-250.

LANDOW, G. (1990). Popular Fallacies About Hypertext. In David H. Jonassen & Heinz Mandl (Eds.), *Designing Hypermedia for Learning*, NATO ASI Series F: Computer and Systems Science, vol. 67. Berlin, Heidelberg: Springer-Verlag, 39-59.

NIELSEN, J. (1998). Electronic Books — A Bad Idea. *Alertbox* for July 26, 1998 (URL: http://www.useit.com/alertbox)

STANTON, N. (1994). Explorations into Hypertext: Spatial Metaphor Considered Harmful. *Educational and Training Technology International*, 31, (4), 276-294.

STAPLE, G. (1995). Notes on Mapping the Net: From Tribal Space to Corporate Space. *TeleGeography1995: Global Telecommunications, Traffic Statistics & Commentary*, October, 1995 (URL: http://www.telegeography.com/Publications/mapping.html)

VEEN, J. (1997). Advanced Web Techniques (URL: http://www.hotwired.com/webmonkey/tools/).

[41] Gomes, M.J. e Dias, P., (1999). Formar à Distância no Ensino Superior: um discurso de opinião, uma reflexão partilhada e uma experiência em curso. *Actas do IV Congresso da Sociedade Portuguesa de Ciências da Educação*. Porto: Sociedade Portuguesa de Ciências da Educação. Vol 2, 533-545.