

# Design for Usability

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"Confusion and clutter are failures of design, not attributes of information."  
Edward R. Tufte, *Envisioning Information*

## Abstract

Graphic design is about communicating. It can enhance a communications effort or it can interfere. In the established world of print, the interference may be minimized given that the user is very familiar with the interface (paper, words, read left-to-right, top-to-bottom in western cultures). However, graphic design on a web site can easily hinder the communications effort, particularly if it results in a change in the interface familiar to the user. Drawing on research from psychologists and communications professionals, this presentation examines the effectiveness of design, from a usability perspective.

## Introduction

Communications — whether written, visual or oral — involves a sender, a message and a receiver. Surrounding the message is extraneous information that researchers call "noise;" this is everything that keeps the receiver from fully comprehending the sender's intent. Noise can be literal (a radio playing in the background that interferes with hearing an entire auditory message) or metaphoric (the use of unfamiliar words, gestures, symbols).

Everything we do with a page, be it on the Web or on paper, either contributes to that communication or obscures it. The medium of the Internet itself is new, but its overriding task or goal — to enhance communication — is as old as civilization. And although the principles of information design are universal — having been tested for centuries in print and for much of this century in electronic forms — many web sites ignore this body of information. This is unfortunate, as the body of research on effective communication principles can help the web designer better communicate with site visitors by minimizing the noise encountered at the site. The result is also increased site usability.

This is not the first time that computer-assisted communication has (temporarily) led to a disregard for sound communication principles. The advent of the Macintosh computer and Aldus' Pagemaker led to pages unintentionally designed to shock the eye; the by-product was to introduce noise in the communication.

Today the web is in a similar position. Tools for publishing are easily accessible; software companies compete to make the most simple, point-click-don't-need-to-think software. The result are web sites that, like the current IBM television commercial (USA) parodies, lead the user to say "wow" or "how" but don't result in sales, persuasion or repeat visits.

Most of the commercial literature written to guide web site creation focuses on technical information: how to code a page, how to add Javascript, how to animate a graphic, how to add video or audio files, how to minimize the file size of a graphic. Only a few authors, such as Laura LeMay in *Graphics and Web Page Design* and Jakob Nielsen in his *Alert Boxes* (<http://www.useit.com/alertbox/>), have begun the less sexy process of applying traditional design principles and communications planning to this evolving medium.

This paper examines several forms of noise present in contemporary web sites and presents alternatives designed to help site designers maximize site usability. This information is important for both internet and intranet designers, but given the intranet goal of communicating data (rather than entertaining or selling) much of this information may be more critical in those applications.

### **Noise Impairs Usability**

The Web provides web site authors/publishers with a unique opportunity to incorporate text, images and sound in ways not imagined even five years ago. The explosion in web sites designed to inform, to sell, to educate, to entertain has led to almost frantic efforts to differentiate one site from another. Much like the traveling "medicine man" of the United States in the 1800s and early 1900s, hyperbole and "loudness" have become techniques of first resort.

The technology involved in developing web sites is evolving more quickly than communications practitioners can follow. From the ill-fated blinkie to painless animations, many web sites can and do feature sensory hyperbole.

But what about the user? Does the arbitrary jarring the senses (auditory and visual) truly lead to more effective communication? The premise of this paper, based upon communications research, is that the answer to that question is "no."

The areas of noise covered here follow: color, backgrounds, images, frames and general readability issues.

## (1) Color

Color appears in many places on a web site; this section focuses on color and text. Netscape has made it possible for web designers to change not only the background color but also the color of text and links. Adding color to text is not a new technique for communicators. However:

“The often scant benefits derived from coloring data indicate that even putting a good color in a good place is a complex matter. Indeed, so difficult and subtle that avoiding catastrophe becomes the first principle in bringing color to information: *Above all, do no harm* . (emphasis native)

— Edward Tufte, *Envisioning Information*

For good or bad (David Seigel thinks bad), the first web browser creators set the default hypertext link colors to a bluish tone for not-visited links and a purplish tone for visited links. (I describe the colors as “-ish” as their hues and values differ depending upon platform and monitor.)

Seigel makes a very good point that unvisited links should stand-out from visited ones, drawing the visitors eye to as yet undiscovered information. Although these default colors do that to some degree, he advocates a brighter colors (such as reds) for links which have not been visited. Those points notwithstanding, tampering with the default link colors poses the following impediments to web site usability.

Whether the visitor is using default browser colors or has customized the colors (perhaps to account for color-blindness or because the user find’s Seigel’s theory compelling), one fact is clear: The user brings a familiar navigation interface — a *personalized interface* — to the web site. This is one arena — ultimate user customization — which differentiates the Web from print and traditional one-way electronic media. The power truly lies with the user.

Thus, specifying link colors in the body tag can led to initial confusion on the part of the visitor. Where am I? Where have I been? Where haven’t I been?

In addition, although there are documented associative meanings for colors (warm colors like red, orange and yellow are stimulating and cool colors like blue, purple and green are soothing), there are also culturally-determined responses to color. For web sites which expect traffic from many nations and cultures, selecting culturally-neutral spot colors can be a challenge (or a headache).

Consequently, for maximum usability, I emphatically recommend that designers NOT specify link colors which forces a new navigation schema onto the unsuspecting visitor, with particular attention given to not changing the “visited link” color. (An unsuspecting visitor is one who hasn’t yet learned that the general controls tab on the browser allows the user to specify background and link colors that override the designer’s preferences.)

There are cases where changing not-yet-visited link colors can actually increase usability, for

example, if different colors are used to take visitors to specific types of information.

Web site examples:

Weyerhaeuser, <http://www.weyerhaeuser.com/>

The site designer has changed link colors; it is very hard to differentiate visited links from unvisited links.

Boise Cascade, <http://www.bc.com/>

The site designer has changed link colors; many corporate sites change not visited links to green in order to appear environmentally-friendly. However in this site, the spec for visited links is a blue that closely resembles the default for not visited links. In addition, the icons are ambiguous.

## (2) Backgrounds

The default browser background is a light grey, reinforcing Edward Imhof's concept (outlined in *Cartographic Relief Presentation*) that spots of color against a light or grey background will both highlight data and also be easy on the viewer's eyes. Conversely, pure or very bright strong colors are loud and can be unbearable when spread across large areas with little relief. "Noise is not music. Only a piano allows a crescendo and then a forte, and only on a quite background can a colorful theme be constructed," he writes.

Wired's subscriber base notwithstanding, readability studies in print media have consistently validated the theory that black backgrounds with "reverse type" (white or another light color) are more difficult to read than light backgrounds with dark type.

And at least on paper, neon colors don't flicker.

Thus, web site designers who are concerned about usability and readability should avoid busy background GIFs and black or almost black solid background colors, particularly if a page is text-intensive. Also, printing these pages can be a chore.

Web site example:

University of Florida Agricultural Site Index,

<http://GNV.IFAS.UFL.EDU/www/agator/htm/ag.htm>

The designer uses a kelly green background for those who visit with graphics off; the lack of contrast with link colors makes this hard to read. Also, there is forced line widths and centered text and graphics.

V Multidimensional Signal Processing, <http://v.brl.uiuc.edu/>

Busy and black.

### (3) Images

This section deals with two graphics usability issues: image maps and animated GIFs. It is true that a well-chosen picture can be worth a thousand words; however, ambiguous icons and dancing artwork do little to further the communications effort. Moreover,

Feedback — sending back to the user information about what action has actually been done, what result has been accomplished — is a well-known concept in the science of control and information theory.

—Donald A. Norman, *The Design of Everyday Things*

It is exactly this communications concept (user feedback) which is missing when a web site uses imagemap navigation to the exclusion of all else. In addition, graphical image maps are often obscure, resulting in trial-and-error, hit-or-miss navigation.

This is in part because users have become accustomed to text navigation and the fact that “visited” links are a different color from “not-visited” links.

Anecdote: Working late in a headquarters building of a Fortune 500 company in February, I encountered an off-site employee using an empty workstation. I asked about his familiarity with the internal project I was working on, and he began cruising the company intranet. This was a fairly sophisticated computer user; however, he clicked on an image map to move forward into the intranet site and returned to the start page with the map. He then turned to me and said, “Why didn’t it (the image map) change color?”

The other issue surrounding image usability is the plethora of animated GIFs sprouting on web sites like bunny rabbits. Like its cousin, the blink, animated GIFs are annoying and often operate counter to the assumed goal of “attention-getting.”

In general, animations draw the user’s eye away from the text, headlines and other material designed to communicate a message. And anything that increases eye movement – including too many graphics, random placement of text and graphics or overly long lines of text – leads to decreased communication.

A web page should not emulate Times Square in New York City in its constant attack on the human senses: give your user some peace and quiet to actually read the text!

- Jakob Nielsen, *Sun*

Animations also tie up bandwidth and can affect browser usability by blocking the information about link URLs which show in the browser’s footer.

However, used judiciously and with forethought, animations can be stimulating and contribute to a web site’s mood. For example, the home page of the Ray Charles web site features

animation that sets the tone for the remainder of the site.

Recommendation: to insure maximum site usability, include text-style navigation as a complement to any imagemap based navigation and avoid gratuitous animations.

Web site examples:

Retail Alphabet Game, <http://isy1.isy.vcu.edu/~jkatzen/alpha/pregame.html>

For those who need convincing about the power of graphics and association, pay this site a visit. It is a clever use of graphic design – the alphabet has been created using one letter each from 26 retail logos.

Union Camp, <http://www.unioncamp.com/>

The lawyers won in this communications battle; check out the disclaimer at the foot of the home page. Here the images are very large and do very little to contribute to visitor information – there is a 75K image map on home page and an 118K header on the paper section.

Agriculture and Life Sciences Research Information, <http://aginfo.snu.ac.kr/>

This is a basic design; however, the home page has an animated lines and very large photos that need captions. Inside the site, the designer has underlined some titles. Some of the background colors are neon green, making the information hard to read.

Kinko's Home page, <http://www.kinkos.com/>

Competing animations: where should the eye (or mouse) land?

Ray Charles Online, <http://www.raycharles.com/>

It is graphics heavy, but it's an excellent example of a site that knows its audience and says, ok, we can't reach everyone with our message. Excellent use of animated GIFs on the opening (splash) page. This is a site as visual and auditory entertainment.

#### (4) Frames

Designers who fashion web sites using frames should reconsider for the following reasons:

A. Frames pages cannot be bookmarked. The only page that can be bookmarked on a frames site is the index page, not pages located deep in the site. Visitors want clear navigation paths and a way to access information directly; site owners want bookmarks, return visits and ease-of-entry via search engines. Frames circumvent both group's desires.

B. Frames take an already compact output area and often chop it into discrete units requiring extensive scrolling. This additional burden on the user runs counter to ease of use concepts and leads to a decline in readability.

C. Perhaps the most important reason, frames are not HTML 3.2 compliant. Frames were created by Netscape and quickly adopted by Internet Explorer. However, in the most recent upgrade of official HTML coding, frames were not added.

Web Site Example:

Jim Jacobson's home page, <http://www.nb.net/~jacobson/>  
Auditory and visual assault plus (many) frames.

## (5) General Readability Issues

One readability issue where web designers could learn a lesson from print is the relationship between typeface size and line length. Over a period of centuries, researchers have determined optimal line lengths for various sizes of type.

Whether the web site visitor relies on default fonts/sizes or a customized configuration, one designer faux pas that has a dramatic (usually negative) effect on readability is specifying line width. Why? Differing monitor sizes or default browser widths can lead to scrolling or asking the user to modify their optimal settings. Long lines with small type are hard for the eye to follow. A related faux pas, centering long lines of type, also impairs readability.

Not only is the same "size" type rendered in different sizes on Macintosh and Wintel computers (larger on the Wintel machine). Users also have the option of specifying their default fonts and sizes. And, a the width of `<width=800>` will also appear different on Mac and Wintel monitors. Finally, web pages with a fixed width of 800, for example, ignore the varied monitor sizes and settings and result in massive scrolling on the more common 640x480 monitors.

Another usability issue involving navigation is the tag which renders text underlined. In pre-computer days, typists (using typewriters) would underline words in order to create emphasis. The underline and typing words in all CAPS were the only way text could be emphasized.

With the advent of word processors and computers, typists can modify type face, size and style – each assisting in communicating emphasis and emotion.

However, the underline style option in HTML should be avoided for two reasons. First, alternative methods of emphasis, with built-in user familiarity, are available (bold, italic, indent via blockquote and to some extent type size). Second, underlining text leads to navigation confusion.

Underlining hypertext links is another browser default setting. Designers who override this command or who add underlining to other text can only cause momentary confusion to the visitor. This confusion can be critical, adding unnecessary time and energy to understanding how to navigate a corporate intranet, for example. This confusion can merely be annoying, perhaps alienating a more savvy web visitor.

Text typed in all caps is also difficult to read, leading to impairment of a site's usability. This is because the eye needs the movement associated with each letter in order to recognize the word. With capitals being the same size (no ascenders or descenders), the eye must slow down to gather information.

Finally, designers can increase site usability and readability by using templates that provide a consistent look-and-feel throughout the site. Print designers such as Jan White have preached this mantra to print designers for several decades; the concept applies to the web as well. When common elements appear in the same place and look the same, users better understand where they are and how to navigate the site.

Web Site Examples:

The Web100, <http://www.w100.com/>

This is a clean, attractive site – both with and without graphics. It is information rich with a clean look-and-feel.

Minnesota, <http://www.state.mn.us/>

A clean, very accessible site, in tune with its users.

## **Conclusion**

Many of these barriers to effective communication and usability could be minimized with site planning. What is the purpose of the site — to entertain or to inform? To call to action or to provide a unique database service? Who is the audience — are they under 18 or older than 55?

The answers to these questions may allow greater flexibility on the part of the designer. For example, a corporate intranet with Netscape as the company browser allows the designer to take greater advantage of “netscapisms” without negatively affecting site usability.

Traditional economics (and Mr. Ford) said, “a car is a car is a car” (a web site is a web site is a web site). That is, consumers would have the same demand for a new black Porche as a new lime green Suzuki. We know this assumption is false (for most people, anyway). Our wants/needs/desires are not universally the same.

If we can accept that premise for consumer goods, why not acknowledge that the web is no different? A visitor is not a visitor is not a visitor. How can we best serve the needs of a varied group and the sponsor or host of the site? By conforming with accepted and tested communications techniques that minimize noise and increase the odds that the message heard by the visitor is the one intended by the sender. By making our sites usable and accessible to all.

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In January 1996, she began publishing a weekly guide to agricultural, environmental and natural resources web sites (<http://www.enetdigest.com/>). Newsletter subscribers represent more than 30 countries and include regulators, educators, students, activists and consultants. She is a member of the governing board of the HTML Writers Guild; Seattle WebGrrls; and the Washington Society of Association Executives. She lives and works in suburban Seattle as a communications and Web content consultant. She welcomes e-mail at [keg@dotparagon.com](mailto:keg@dotparagon.com); URL: <http://www.dotparagon.com/>.