The role of color and visual design in electronic marketplaces

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Abstract

This paper presents a part of the impact that color has in e-commerce application. We present in brief, some simple techniques that can be applied in the design of a business to consumer application in order to improve user's navigation experience.

1. Introduction

In the context of business to consumer e-commerce, the Web site is the key Interface between customers and suppliers. To ensure users' satisfaction, Web sites should be responsive to users' needs. Explicit attention should be given to the quality of a firm's Web presence [Nielsen, 2000; Palmer, 2002; Pearrow, 2000; Schneiderman, 1998].

Although usability has been conceptually defined and operationally measured in multiple ways, it has been associated with many positive outcomes. In this sense, usability emerges as a key measure of Web site quality. According to Gray and Salzman (1998), "The most important issue facing usability researchers and practitioners alike is the construct of usability itself".

Usability has emerged as a key concept of Human Computer Interaction. As Web sites interface has been widely recognized as a key factor in predicting online consumer behavior, major attempts have been done in extending usability principles to Web sites in order to assess the respective quality of companies' Web presence.

Indeed, the usability of a Web site can have a positive impact on the firm's success in the Internet market through users' satisfaction [Agarwal and Venkatesh, 2002; Buschke, 1997; Klein, 1998; Lam and Lee, 1999; Lohse and Spiller, 1999].

The notion of usability has been a key theme in human-computer interaction (HCI). Usability has typically taken an engineering approach in an attempt to identify a set of principles and common practices that will ensure usability as an outcome of system design [Nielsen, 2000; Pearrow, 2000; Shneiderman, 1998].

According to HCI studies the design of information systems should include features and characteristics that make it easy for users to interact with and use the system. Relying on this approach, Nielsen (1993) defined a set of design principles, articulating five key elements: consistency of the interface, system response time, mapping and metaphors, interaction styles, and the use of multimedia.

As the Web becomes an increasingly essential Interface, usability research began to focus more specifically on extending the basic usability principles into the Web environment. Nielsen (2000) and Shneiderman (1998) suggested four parameters for usability: (1) navigation, (2) response time, (3) credibility, and (4) content. This suggests easy- to- use navigation, frequent updating, minimal download times, relevance to users, and high-quality content that also takes advantage of the hypermedia capabilities inherent to the Web medium. Palmer (2002) reports on Web site design and the features of the Web site that need to be measured to determine its effectiveness. The approach combines information systems usability and design literature and Media richness theory [Daft and Lengel, 1986] and five usability dimensions were suggested: (1) Download Delay, (2) Navigation/Organization, (3) Information Content, (4) Interactivity, (5) Responsiveness. Microsoft Usability Guidelines, analyzed with respect to Web sites in Agarwal and Venkatesh (2002), suggest that the Web site content, ease to use, promotion and emotional content are important aspects of usability.

In another framework, Rosen et al. (2004) suggest that Web site usability should address users' needs of understanding and exploration. Accordingly, they describe three dimensions of usability: (1) the coherence dimension includes a logical and friendly environment, ease of navigation, and clarity of design, (2) complexity implies that the web site should contain a variety of information and images that can be explored by the user, (3) legibility refers to the creation of a consistent and distinct design for the Web site.

Other measures of usability include task completion time at the Web site, or number of tasks performed per unit time [Huang, 2002]. Subjective measures include enjoyment, playfulness intention to use, familiarity, aesthetics and perceived systems quality [Lacerof and Paterno, 1998]. The definition of usability has been a problem, and a well defined set of usability criterion is not available [Agarwal and Venkatesh, 2002; Gray and Salzman, 1998; Huang, 2002]. Indeed, Sears (2002) suggests that

usability is an elusive, comprehensive, and complex concept. It is difficult to analyze, because it is contingent upon the system and its users, and since Web users are highly diverse in terms of their computing experiences, it is not easy to design a system to fit everyone's needs [Huang, 2002].

This paper will present very briefly the importance of color in e-commerce navigation experience. We will describe the use of safe colors in web design (section 2) and demonstrate some tips where information presented in a visual way can improve the usability of a e-commerce application (section 3).

2. Color in web design

In spite of the challenges posed by recent technology, web designers can employ many techniques that deliver the highest degree of color accuracy; that means the most accessible colors.

The degree of color accuracy required for an e-commerce site depends on the content, For example, food, clothing, cosmetics and home furnishing require the highest degree of fidelity. Software, computers, books, travel and many other professional services may be less dependent on color accuracy. Web designers can maximize the accessibility of colors by employing techniques that create the most stable and attractive hues as well as the smallest file sizes. Designers can also take steps to prepare for the future world of e-commerce when images and browsers will be able to convey color-accurate information.

In the physical world of commercial design, architects and interior designers must have perfect color vision in order to select colors and materials for a store. In e-commerce the same requirement applies for both the individual as well as the equipment. Web designers must work on computer systems that have sufficient gamma correction and high quality monitors. A simple test can diagnose the quality of equipment. Graphic designers use 24-bits for colors and full gamma correction while simple users use 8-bit color schemes .

There are only 216 colors that are safe for web. Safe means that the can be presented the same way in every computer. Designers should use these colors to design logos and color identities. This palette can be used for both Windows and Macintosh plaforms (Figure 1).

Moreover this palette can be used to solve the problem of presenting colors in 8bits systems. In this case, whenever color needs to be presented and it is outside this palette, it can be replaced by one close to this one or using a dithering between 2 or more available colors (dithering, Figure 2).

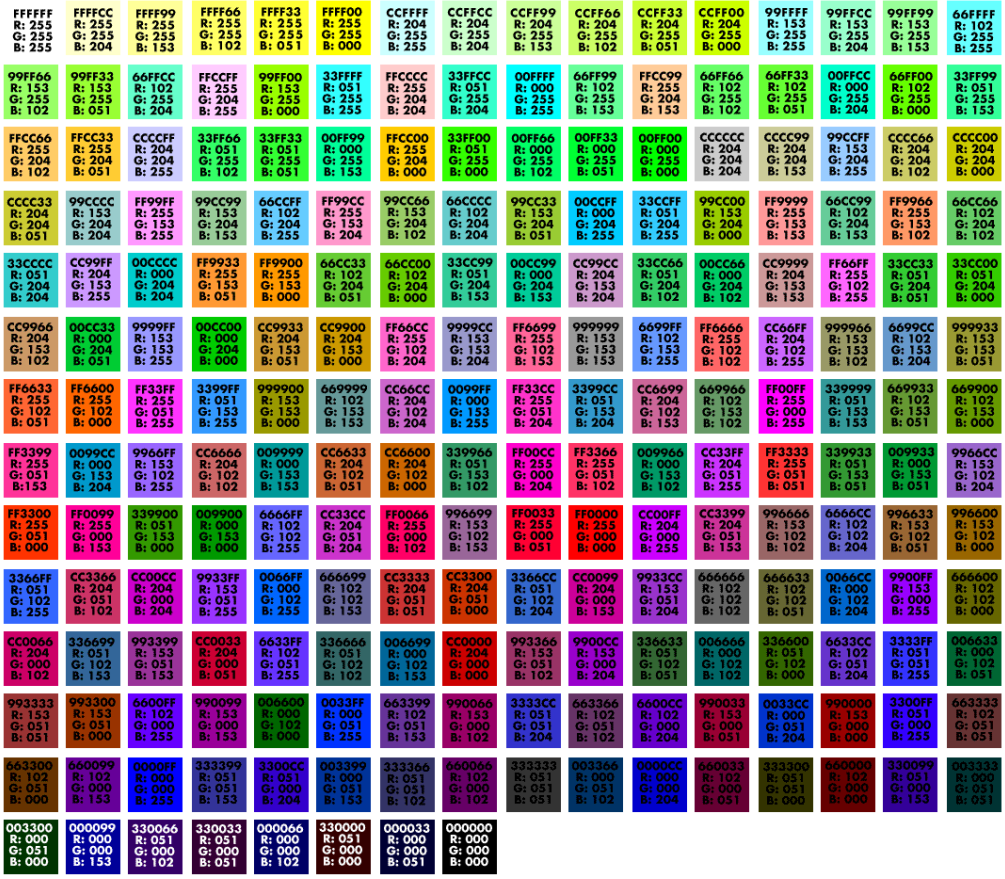

Figure 1. *Web safe colors*

Figure 2. *Dithering*

3. The role of color and visual design in e-commerce

When a customer enters in a shop, he should be able to move in its sections and search for available products. If products are randomly available in the shelves, the customer will probably leave without buying anything. This is also the case for e-commerce sites. Poor design and navigation difficulties can create negative impression to web users.

A customer should be able to locate and distinguish the different sections of the e-shop. In the physical world, this is done by using huge labels and maps of the store. Colors are one of the most powerful tools that can be used in order to distinguish different sectors of the store. They can even separate the content area from navigation information (figure 3), or represent the basic sections and subsections of the web site (figure 4).

Figure 3*. Blue in the right photo distinguishes the navigation section from the section where content is presented.*

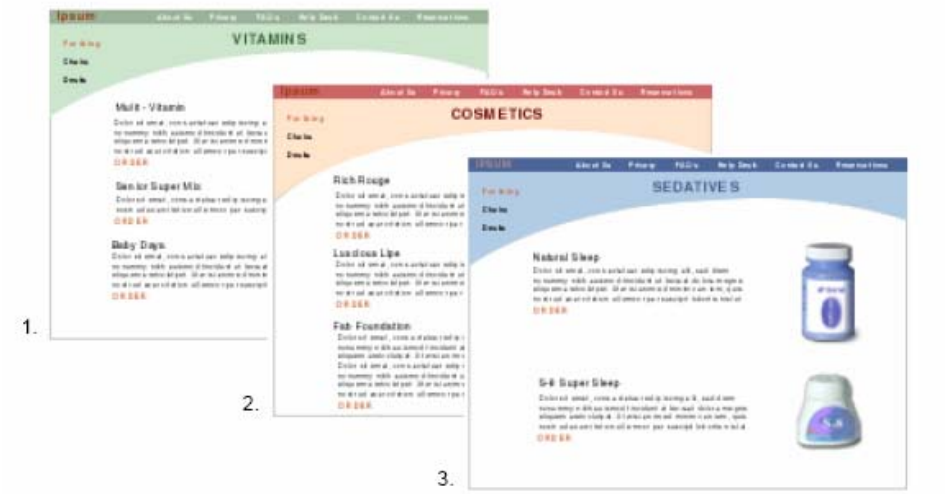

Figure 4*. The same color can be used in the navigation bar but different colors mark different sections in the store.*

Working with tabs improves the usability in navigation. Amazon.com was one of the first sites that used tabs (and they still do) in order to define the several sections of their store. Color tabs are forming a color identity for each region. Color coding in tabs improves the visual effect of the different section and provides more information to both frequent and random users to find their way in the web site (Figure 5).

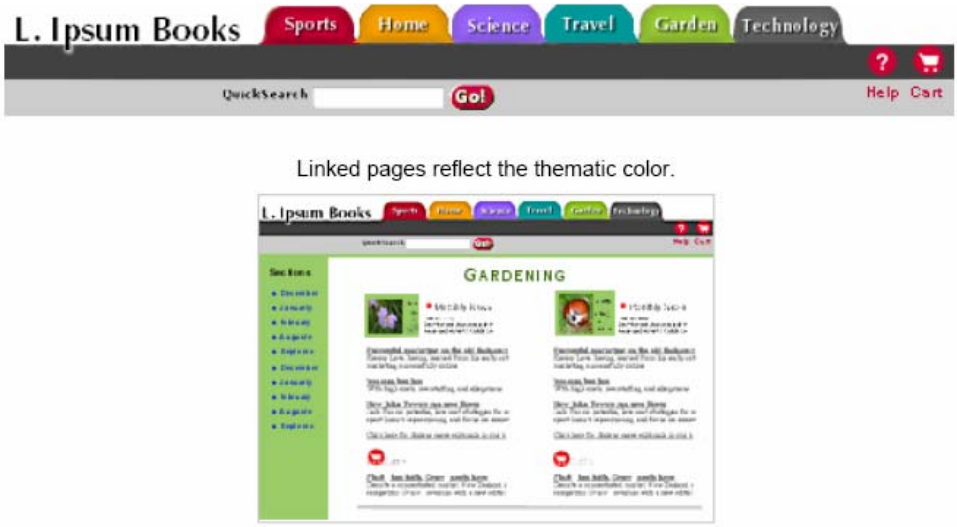

Figure 5*. Color tabs are also individual marks of the identity of each section.*

The space, where content is presented, needs to be formed in an appropriate way. Although a webpage has fixed dimensions, web designers should use these limitations in order to create the appropriate space for users to navigate though content. Using tables and style sheets, designers can create "functional spaces" between the content in order to help customers eye navigate though the available information (Figure 6). These spaces will help customers' eyes to relax between products and information.

Figure 6. *In the right photo, column spaces provide a more easy to read and understand image.*

Product presentation is really focused in colors. Despite the color of a product, special effects can be used to improve the visual effect. Colors can be used to group items with common characteristics. In Figure 7, the use of a grey background, which is one of the safe colors for the web, groups visually the three items and improves the way products are listed on the web page.

Figure 7. The background in the left case groups the three items.

Similar techniques can be used in order to visually organise text (content), like in Figure 8. Graphics like horizontal or/and vertical colored bars can be used as structural elements of the website. These elements visualize the end of something and the beginning of a new item (paragraph, column, product).

Figure 8*. Two different colors group three different texts*

In presenting text, colored letters work best when they are in bold fonts and have high-contrast backgrounds. The easiest text to read is in strong black fonts on white backgrounds. Dark fonts and busy or dark backgrounds do not work well together, nor do light fonts on light backgrounds. Avoid yellow or light green letters on white backgrounds.

Information should never be distinguished by color only, but should be combined with bolder fonts, underlining, dashes, italics, or other typographical features. This is particularly important when information is being presented in graphs and maps.

4. Conclusion

From the above described techniques, it is clear that color can influence the way people look, understand, think and react in the presentation of any information on the

web. Actually, there is no magic recipe to guarantee success. The proper use of colors may improve the visual effect of a web page. Color is a basic structural unit for the web. Scientifically it is one of the ingredients of human vision. Psychologically, it gives a different "message" to mind and soul. Having these in mind, while designing a web page, will give designers in a second thought when choosing "just" a color for a web site.

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