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| [Volume 5 Issue 1](#) | [Past Issues](#) | [A-Z List](#) |

Usability News is a free web newsletter that is produced by the Software Usability Research Laboratory (SURL) at Wichita State University. The SURL team specializes in software/website user interface design, usability testing, and research in human-computer interaction.

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## Aesthetics and Usability: A Look at Color and Balance

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As websites continue to fight for the attention of potential users, designers must begin to look not only at the inherent usability of the site, but also its perceived usability. For instance, Tractinsky (1997) found a correlation between perceived usability and aesthetics when investigating ATM machines. Subjects based their overall opinion of the usability of the ATM on the "look" of the machine. Moreover, in examining users' first impression of websites, Shenkman and Jonsson (2000) found that the best predictor for the overall judgment by typical users of a website was its beauty.

Design principles are frequently utilized by graphic designers to create aesthetically pleasing websites. The term harmony can be defined as a pleasing arrangement of parts, whether it be music, poetry, or color. In visual experiences, harmony is something that is pleasing to the eye. Two design principles that influence harmony are balance and color. When a website is harmonious, it engages the viewer and creates an inner sense of order, a balance in the visual experience. When something is not harmonious, it becomes either boring or chaotic (Lauer & Pentak, 2002). According to Lindgaard (1999), color is a strong predictor in the overall appeal of a website.

Balance too plays an important role in the appeal of a website. When websites are balanced, users feel a psychological sense of equilibrium (Lauer & Pentak, 2002). Related to this principle is the mathematical concept known as the Golden Section. The Golden Section refers to a proportion in which the ratio of the whole to the larger part is the same as the ratio of the larger part to the smaller. This translates into a ratio that is approximately that of a standard 8.5 x 11 page. The Golden Section has been used extensively by architects, musicians, artists, and mathematicians over the centuries, and is today utilized by graphic designers to create appealing websites.

This study focused on the role aesthetics plays in website usability. Perceived usability was measured as the design principles of color and balance were manipulated. Color and balance were selected due to their integrated influence on website harmony and stated importance in previous research (Matthews, 1999; Lindgaard, 1999).

## METHOD

### Participants

Eighty college students volunteered for this study (25 men, 55 women) and ranged in age from 18 to 43 ( $M = 20.53$ ). The participants consisted of 41 freshman, 13 sophomores, 12 juniors, and 14 seniors. The median Web use for the participants was 2-6 hours per week (93% used the Web a few times per week or more).

### Procedure

The website selected ([www.createforless.com](http://www.createforless.com)) was chosen based on the design principles of interest. The original site, and three variations of this site were used to test the impact of color and balance on

perceived usability (see Figure 1). The sites were identical in content varying only in color, balance, or a combination of the two.

The original website had good balance or "equal distribution of visual weight along the horizontal and vertical axis," (Lauer & Pentak, 2002, p. 76). The first site variation consisted of poor visual balance. This balance was manipulated by dispersing the visual weight of the entire screen by moving the location of specific objects on the screen.

Color on the original site followed a triadic color scheme. Triadic color schemes involve hues that are equally spaced along the color wheel. Other standard color schemes include analogous, complimentary and split-complimentary. Color was manipulated by using a non-standard color scheme. This manipulation of color created the second variation from the original site. The final variation was a combination of the color and balance manipulations.

Participants examined one of the four sites. They completed five search tasks with answers located at various levels within the site. After completion of all the search tasks, participants completed a user satisfaction survey. Participants were then shown screenshots of all four sites and asked to rank the four sites based on perceived usability and overall aesthetic appeal.



Original Site



Altered Balance Site



## Altered Color Site



## Altered Color and Balance Site

Figure 1. Four site variations. (click on image to enlarge)

## RESULTS

### User Satisfaction

A between-subjects ANOVA was performed to determine if there were significant differences in overall user satisfaction scores derived from the satisfaction survey. No significant differences were found between the four sites [ $F(3, 76) = .427, p > .05$ ].

### Aesthetic Appeal

After viewing the screenshots of the four homepages, participants were asked to rank the sites from 1 to 4, with 1 being the most aesthetically pleasing and 4 being the least. Ranked aesthetic preference was measured by means of a Friedman  $\chi^2$ . Significant differences were detected [ $\chi^2(3) = 40.05, p < .01$ ]. Post hoc analysis indicated that the original site was significantly preferred over the site with manipulated color, and the site with both color and balance manipulations. The site with altered balance was significantly preferred over the site with manipulated color, and the site with both color and balance manipulations (see Table 1).

Table 1. Aesthetic Appeal Mean Rankings

Site	Mean Rank
Original Site	1.95
Altered Balance	2.15
Altered Color	2.77
Altered Color and Balance	3.13

### Perceived Usability

After viewing the screenshots of the four homepages, participants were also asked to rank the sites from 1 to 4, with 1 being the site they perceived easiest to use and 4 being the site perceived as most difficult to use. Ranked usability preference was measured by means of a Friedman  $\chi^2$ . Significant differences were detected [ $\chi^2(3) = 28.21, p < .01$ ]. Post hoc analysis indicated that the original site was significantly preferred over the site with manipulated color, and the site with both color and balance manipulations. The site with altered balance was significantly preferred over the site with both color and balance manipulations (see Table 2).

**Table 2. Perceived Usability Mean Rankings**

Site	Mean Rank
Original Site	1.95
Altered Balance	2.42
Altered Color	2.56
Altered Color and Balance	3.07

## **DISCUSSION**

In general, there were no statistical differences in user satisfaction between the four sites. This appears to support the idea that user satisfaction is related more to successful navigation than aesthetic appearance. However, when asked to predict which of the four sites the users thought would be the easiest to use, they ranked the aesthetically pleasing site the highest. The aesthetically pleasing site (original) ranked significantly higher than the site with manipulated color and the site with both color and balance manipulations. The manipulated balance site also ranked significantly higher than the site with both color and balance manipulations.

Regarding aesthetic appeal, both the original site and the altered balance site were significantly preferred over the site with manipulated color and the site with both color and balance manipulations. A common theme that emerged from the study was the importance of color. The sites that used the triadic color scheme consistently ranked higher than the ones with altered color schemes. A majority of the participants commented that color was a factor in how they ranked both the aesthetic appeal of the site and how easy they thought the site would be to use.

In terms of initial impressions of a website, it appears that design principles do indeed play a role. Further research is needed to determine how or if design principles also affect inherent usability of websites.

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