



Principles for Creating Web Sites: A Design Perspective

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ABSTRACT

The importance of aesthetics is frequently forgotten, in order to solve this problem, we identified in the literature some of the theory that is underlying graphic design, gestalt theory and multimedia design. Based in the literature review, we proposed principles for web site design. We also present a tool to evaluate web design.

1. INTRODUCTION

Internet plays an important role in the communication between people and is also an important corporate tool. Its importance is so significant that web presence is considered as a strategic issue. Nowadays to have presence in the web is a must, it reveals an image of the organization, and it helps to communicate with the stakeholders. In most countries it is also mandatory to use Internet for e-government purposes. But, the importance of aesthetics is frequently forgotten, as long as approaches based in communication, usability and technique are considered more pragmatic. Aesthetics is relevant as long as the web is an invitation card for the organization.

According to Anders (1999), "there are three things to remember about website design: content is king, content is king, content is king. But in order to ensure its primacy, we must present the content in a way that is attractive, orderly, and, if possible, original".

In this context Brink et al. (2002) suggest the importance of design principles in the web design, and specifically in the page design layout, even having as main reference the concept of usability.

In the next section, a literature review of design is developed, starting in the graphical design theory, concluding in the multimedia approach. Then, based in the literature review, design principles are identified and principles for web site design are proposed. In the following section we present a tool to evaluate web design.

2. FROM GRAPHIC DESIGN THEORY TO MULTIMEDIA DESIGN

2.1. Graphic Design Theory

The graphic design theory explains the different features of design which are considered when composing a piece of fine art or producing a graphic layout in commercial art, forming the basis for many decisions in design (Mills & Smith, 1985, Lauer, 1985, Wilson, 1966).

As long as one of the most important elements of websites is the image, it seems to be understandable that graphical design theories could be applied. One perspective may be to consider design elements as well as design principles.

Design elements are the building blocks or basic units in the construction of a visual image. The elements of design include line, direction, shape, size, texture, value, and colour (Graves, 1951). On the other hand, principles of design help make visual images agreeable and interesting to watch. Design principles include repetition, alternation, harmony, gradation, contrast, dominance, unity, and balance (Graves, 1951).

2.2. Gestalt

Atomism examined parts of things with the idea that these parts could then be put back together to make wholes. Atomists believed the

nature of things to be absolute and not dependent on context. This perspective has his roots in several sources like the medieval interpretation of Timaeus of Plato. In the Timaeus, Plato observes the geometric fact that five and only five regular geometric solids are possible.

Gestalt theory first appeared the 90s of the XIX century as a reaction to atomism, the prevalent psychological theory of the time. Gestalt theorists were fascinated by the way our mind perceives the totality, even when there are incomplete elements (Behrens, 1984, Mullet & Sano, 1995). To the Gestaltists, things are affected by where they are and by what surrounds them so that things are better described as more than the sum of their parts (Behrens, 1984). Gestaltists believed that context was very important in perception. An essay by Christian von Ehrenfels discussed this belief using a musical example. Take a 12-note melody. Play it in one key, say the key of mi. Now changes to another key, say the key of do flat. There might not be any notes the same in the two songs, yet a person listening to it knows that it is the same tune. It is the relationships between the notes that give us the tune, the whole, not which notes make up the tune. In another example, Moore & Fitz (1993) starts with a very poorly designed diagram and by using gestalt principles, transforms it into one which is much more useful.

Gestalt principles are figure and ground, similarity, proximity or contiguity, continuity, closure, area and symmetry.

2.3. Multimedia Design

Because of the similarities between computer based multimedia and web sites, it seems useful to consider guidelines for design, which have been developed for multimedia. On the other hand, computer-based multimedia systems integrate several of the following information types: text, graphics, images (still images pictures), moving graphics (animation), moving images (motion video) and sound. (Fluckiger, 1995) These components may be linked together on a web page, just like multimedia that also links these elements together.

Research into perception, animation, and multiple-channel communication (Moore et al., 1996) contains findings, which may be important for web design. Multimedia goes towards a digital representation in opposition of analogue formats. (Fluckiger, 1995)

Some studies indicated that pictorial information is remembered much more easily than text (Anglin et. al, 1996, Braden, 1996, Horton, 1994) leading to the dual code theory: people store information in two ways depending on whether it is verbal or pictorial information. If the information is placed in a visual way, 55% is retained, only 7%, if it is verbal, and 38% depends on the way the information is presented.

Because text accompanied by pictures or animations corresponds to saving information into two separate ways in the brain (encoded verbally and as a picture) there is more likelihood that people will remember the information if it is presented in both formats. On the other hand, care must be taken when combining different modalities (picture, text, audio, animation) simultaneously. Certain combinations overflow the information processing capacities of the brain. Combining audio with text seems to overload our channels. Unless the message is

directed to certain targets, for example when waves files corresponds exactly in the same words with the text, it may be directed to younger children, who can't read yet. Audio may be combined with pictures or animations, or text with pictures or animations, given that the text and audio appears to be stored and processed in a different manner than the pictures and animations. A multimedia project must combine one or more media but one of them should depend on time, such as sound, video or animation.

3. PRINCIPLES FOR WEB SITE DESIGN

Multimedia and web sites are interrelated and sometimes websites include multimedia components. Consequently, we think it is adequate to include guidelines for web design, which have been developed for multimedia.

Consequently, some general principles derived from multimedia design include simplicity, consistency, clarity of design. In fact according to Misanchuk, et al. (2000) "Keep it simple; be clear; and be consistent - these three bits of advice are the foundations of good layout. Screens within a given multimedia package should be consistent in all ways, from the level of discourse and style of presentation from one section to another, to the style of graphics used in different places".

There are also a set of principles that may be called aesthetic principles and includes concerns such as balance, harmony and unity (Schwier & Misanchuk, 1993 Misanchuk, et al., 2000). In fact according to Misanchuk, et al. (2000). "Balance, unity, and harmony are three primary properties that designers manipulate in order to create aesthetic experience. When these properties are manipulated in such a way that the effects satisfy people's natural (and conflicting) cravings for order, predictability, surprise and novelty, then designers are creating aesthetically pleasing objects or experiences."

Further design principles derived from the gestalt theory of perception include figure and ground, similarity, proximity, continuity, closure, area, and symmetry.

3.1. Simplicity

Although gaining attention is an important part of any communication act, it is important trying to keep the message as simple as possible (Schwier & Misanchuk, 1993). Using only the amount of text and graphics used should be absolutely necessary to get the point across. Superfluous graphics can interfere with understanding (Anglin et al., 1996; Levie & Lentz, 1982) and an overabundance of fonts or colours can distract rather than assist perception. Simplicity in a site helps to focus the attention in the really important matters of the message.

3.2. Consistency

According to Ulrich (2001), this principle refers to the reliable placement of content on every page of the site.

The layout of pages should be kept consistent. Inconsistencies force people to waste time trying to understand how to navigate, or where to find the answers to questions we have. It increases cognitive overhead. Norman (1988) and Schwier & Misanchuk (1993) suggest that developers should attempt to reach consistency in the level of discourse and style of presentation from one section of the sequence to another.

This consistency is obtained by an adequate placement of various items, like orientation information, navigation devices, person input, feedback and operating instructions. The use of use colour (including "greys" in black and white), access structure (e.g., use of headings), use of cues (font, including size and style; bolding, italics, and colour), style of graphics, terminology (directions, prompts, menus, and help screens), names of commands and manner of evoking them should also be adequately considered in order to obtain consistency. It is also important to identify interaction behaviour required in similar situations. For example, we should not require a person to click on a button one time and to type a character another time, if the situations are highly similar.

Grouping objects with similar functions together in one spot can make a page feel more consistent. A page, and every page in a site, should have its navigation options located in a similar location (e.g. in the side and below the text at the bottom). The audience knows where to find the navigation options on every page and this fosters consistency.

Similarity in shape, style and colour can also foster consistency. The sidebar and bottom navigation boxes may use the same colour to tie the navigation elements together.

If our logo is in the upper-left corner of one page, we should put it in the same place on the other pages. Every page of our site can be new and different but some thing should be in the same place so people feel comfortable. The same rule should be considered in the alignment. When choosing horizontal and vertical alignment setting for our text and graphics should be kept consistent throughout the pages of our site.

In order to evaluate the consistency storyboards are often developed. Storyboards consists in snapshots of screens, which are often created using software presentation packages, or sometimes sequences of paper mock-ups, which describe the basic functionality and movements' user, may take through the site.

3.3. Clarity

Schwier & Misanchuk (1993) suggest to prepare (and reduce) the message down to the absolute essentials for improving clarity keeping the instruction at a language level compatible with the intended audience, avoiding jargon and overly scholarly language, unless that is your audience, presenting ideas succinctly, and keeping prose lean. The use of short sentences and bulleted lists whenever possible is also advisable. The active is preferable rather than the passive voice.

Other advices may be followed, like avoiding away from negative statements if possible or double negatives entirely. Informal language, personal pronouns, familiar examples are also prudent. . The use of inclusive (i.e., non-sexist, non-racial) language is also adequate. The same applies to the text lettering; the chosen letters should facilitate the reading in order to spread the message. Contrast is also an aspect to be considered, human eye distinguishes better objects if contrast is present. Too many moving effects are nonfriendly to the human eye, some people tend not to be concentrated on the screen.

3.4. Balance

Objects are in balance when they are of equal weight. If we have several small items on one side, a large object on the other side can balance them. Screen balance works in much the same way. It can be affected not only by the size of objects, but also their value (i.e. lightness or darkness, termed visual weight).

We can have formal or informal balance. Formal balance is symmetrical, with the items on one side of the screen being similar in shape, size and colour to the items on the other side of the screen. Formal balance is usually much easier to design. Informal balance is usually asymmetrical, with several smaller items on one side being balanced by a large item on the other side, or smaller items being placed further away from the centre of the screen than larger items. One darker item may need to be balanced by several lighter items. When a screen is not balanced, it creates a feeling of tension, as if the screen might tip, or things might slide off the side, just as the unbalanced beam would tip to one side. As Mullet and Sano (1995) discuss, many 20th Century typographic designers "discovered the greater vitality and inherent visual interest provided by active, asymmetric layouts". But they caution that creating asymmetric layouts is much more difficult to do, and depends on careful placement to compensate for the differences in size, position and value of the major elements of a design.

3.5. Harmony and Unity

In order to create harmony and unity, we must design a page or site using consistency and repetition. Similar fonts and colours, pictures that match the topic, and graphics, which are similar in tone used within a site, will make that site appear harmonious. Ensuring that all the items, which are present on a page, appear to belong together and different pages in the site are similar in content and design can foster unity. Visual identity can be very important in a unified site design - similarity amongst pages ties a site together and gives it a feeling of totality. For that reason storyboarding site is of most importance, because it helps to visualise whether the site is harmonious.

3.6. Figure and ground

Gestalt theorists were intrigued by way our mind perceives totality beyond incomplete elements (Mullet & Sano, 1995, Behrens, 1984). According to Behrens (1984), to the Gestaltists, things are affected by where they are and by what surround them. The terms figure and ground explain how we use elements of the scene, which are similar in appearance and shape and group them together as a whole. Similar elements are contrasted with dissimilar elements (ground) to give the impression of a whole. A breakdown of figure and ground occurs with camouflage, where the objective is to make the figure so much like the ground that it disappears from view.

3.7. Similarity, Proximity/ Contiguity, Continuity, Closure, Area and Symmetry

According to Mullet and Sano (1995) the following Gestalt principles apply in design: the principle of similarity, the principle of proximity or contiguity, the principle of continuity, the principle of closure, the principle of area and the principle of symmetry.

- The principle of similarity states that objects which share visual characteristics (or look alike) such as shape, size, colour, texture, value or orientation tend to organize themselves into groups or units. For example, if a site has separated, but aligned objects with the same colour, it can give one can visualise a row or a column.
- The principle of proximity or contiguity states that objects, which are closer together, tend to visually organize themselves into groups or units. According to this principle, spacing between objects is of most importance in the composition of a web page. If objects are closer to each other it can appear another object made by small parts.
- The principle of continuity predicts the preference for continuous figures. Usually in the menu bars buttons appear next to each other aligned, giving an idea of some sort of order or organization. Continuity helps users in the contextualization in the site.
- The principle of closure applies when we tend to see complete figures even when part of the information is missing. Once more, simple objects can be so effective as the most complex ones and in the web this aspect is very important, the simpler the object is, the less space needs, and pages need less time to appear on the screen.
- The principle of area states that the smaller of two overlapping figures is perceived as figure while the larger is regarded as ground.
- The principle of symmetry describes the instance where the whole of a figure is perceived rather than the individual parts which make up the figure. If a page is symmetrical, the page is naturally balanced. A well-balanced display will guide the movement of user's eye across the page.

4. A TOOL TO EVALUATE WEB SITE DESIGN

In order to evaluate web design, we developed a survey based in the principles of web site design. This survey is used as support to evaluators.

Table 1 – Example of the evaluation of two websites3.

	Site1	Site2
Simplicity,	1	3
Consistency	3	3
Clarity of design	4	2
Balance	4	2
Harmony and unity	3	2
Figure and ground	4	3
Similarity	2	3
Proximity	2	3
Continuity	2	2
Closure	2	2
Area	2	3
Symmetry	3	4

Consists in a combined list of the various principles of Gestalt, design theory and multimedia design. The scope it is to see whether design is simple, consistent and focused. The structure and visual organisation should stress a visual flow. In the following table, it is shown an example of the results obtained through the evaluation of two websites. The scale used was a 5-point scale, where one's corresponds to the lowest value and five the highest.

5. DISCUSSION

In this paper, we explicit the principles of website design. Based in those principles, we propose a tool. In fact, this approach is different from the one that is based in a pure technical approach; it is also different from the usability perspective (Nielsen, 1993); or from what we may call a communicational perspective (e.g. Smith, 1997, Kapoun, 1998).

But, this approach is not completely tested. Some verification may be performed:

- Verify if the use of design principles contribute to a more effective site;
- Verify if different evaluators have different criteria;
- Verify if experts (like graphical designer) have different perspectives, compared to non-expert evaluators.

6. CONCLUSION

The importance of aesthetics is frequently forgotten, as long as approaches based in communication, usability and technique are considered more pragmatic. It is why we developed a literature review in order to identify some of the theory that is underlying graphic design. Based in the literature review, we proposed principles for web site design. We also present a tool to evaluate web design.

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