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 a strategic issue. But, the importance of aesthetics is frequently forgotten, as long as approaches based in communication, usability and technique are considered more pragmatic.

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 art or creating a graphic layout in an advertisement (Mills & Smith, 1985, Lauer, 1985, Wilson, 1966).

As long as one of the most important elements of websites is the image, it seams 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). But, as may be analysed in the following sections, other authors identified different design principles.

2.2 Gestalt

Atomism examined parts of objects (or things) with the idea that these parts could then be put back together to make wholes. Atomists believed the nature of objects 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, objects are affected by where they are and by what surrounds them so that objects 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 (e.g. Foley, et al., 1997). On the other hand, animation, sound, text, and pictures 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.

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.

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. For example, combining audio with text seems to overload our channels. 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.

3 PRINCIPLES FOR WEB SITE DESIGN

There are 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."

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".

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

3.1 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. In opposition, a design is unbalanced when the eye is needlessly drawn to meaningless discontinuities.

On the other hand, it can be affected not only by the size of objects, but also their value (i.e. lightness or darkness, termed visual weight).

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.

3.2 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.

3.3 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 and 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.

3.4 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, student input, feedback, operating instructions.

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.

3.5 Clarity

If the meaning of an image is readily apparent to the viewer, we have visual 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.

3.6 Gestalt Principles

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.

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.
- The principle of **proximity** or **contiguity** states that objects, which are closer together, tend to visually organize themselves into groups or units.
- The principle of **continuity** predicts the preference for continuous figures.
- The principle of **closure** applies when we tend to see complete figures even when part of the information is missing.
- 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.

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.

The scale used was a 5-point scale, where 1 corresponds to the lowest value and 5 the highest.

Balance (B_p)	The visual weigh of the elements is balanced in the page.
Harmony and unity (H_p/H_s)	Elements and pages are organized in order to give a feeling of totality.
Simplicity (S_p/S_s)	Use only the necessary elements to reach the purposes.
Consistency (C_p/C_s)	The similarity and repetition allows presenting page/site with uniformity.
Design Clarity (D_p)	Readability of graphical elements in a page.

A first step to quantify the quality of the design may performed by the following formula:

$$Q_s = \frac{\sum_{p=1}^{n}(B_p + H_p + S_p + C_p + D_p)w_p}{\sum_{p=1}^{n}w_p} + H_s + S_s + C_s$$

w_p – Weight of each page resulting from the hierarchy of the site or the importance assigned by the evaluator.

In order to understand the quality of a given site (s) it is important to identify other dimensions to decode the quality rating (Q).

Here, the evaluator will analyse in what extent those concepts were used and if they were applied correctly.

Figure and ground
Similarity
Proximity
Continuity
Closure
Area
Symmetry

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).

At this moment, we verified that there is some difficulties in the evaluation of the degree of gestalt principles applicability.

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.

Other important issue consists of creating a metric that could combine all the information obtained from principle evaluation.

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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