Some Aspects of Color in Design. Digital Tools that Increase Productivity

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Abstract: The beauty of the point where we are in history right now is that we can benefit from centuries of scientific and artistic researches in the field of color theory. There are whole volumes that have been written about the color theory, volumes that are worth tos pare a bit of time on, and whom are digging deep into this subject. In the field of design (graphic design, web design, interior design, etc.), one of the hardest aspects of working with colors is that sometimes when the colors have not yet been arranged in a design, they do not seem to work well together. However, once applied, their visual harmony becomes evident. We are fortunate to have these days several tools at our disposal that make color selection extremely easy when used properly. And, best of all, they will continue our understanding of color theory.

Key-words: art; design; color; color theory; graphic design; digitalization

1. Introduction

Color is one of the fundamental elements of human existence. It is present in our life and activity, making its mark on everything around us: from the colors of our clothes, inside the house, to those outside it (buildings, streets, shops, etc.).

How color influences our souls, bringing us coldness or warmth, joy or sadness, peace or agitation, depends to a great extent on our inner peace and range of emotional feelings[3]. For all this, color has always been used and studied. At the same time, color is one of the fundamental factors in the development of man's creative capacity[4].

Colors are used very carefully in design. For example, in the interior design, at first glance it may seem simple to choose the colors in one room or another, given the fact that you know your preferences. However, a professional result is based on a good knowledge of the combination of colors, but also on the psychological effects produced by them. You can change your mood or you can make a room look bigger and brighter or create an intimate atmosphere, due to the chosen colors. Thus, color plays a central role in interior design, influences our emotions and can transform space.

Color perception[5] has been and is explained, using the principles of optics and neurophysiology. Light intensity also plays an important role in the mechanism of chromatic

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[5] Sarah R. Allred and Jonathan Flombaum. 2014. "Relating color working memory and color perception." *Trends in Cognitive Sciences* 18(11): 562-565.

perception, because from a certain degree of luminescence, the eye poorly perceives chromatic changes.

In modern society, colors have a strong physical and psychological[6] influence in most areas of activity, from industry and medicine to artistic, design fields and aesthetic education. And these colors can only be optimally used if they are researched and analyzed by modern scientific methods, including artistic methods.

2. About Color and Color Theory

2.1. Color theory in design

Color theory actually covers a complex set of principles[7], but, when we talk about design principles, at the most basic level is the interaction of colors in a design product (Kwallek, Woodson, Lewis, & Sales, 1997)[8] through complementarity, contrast and vibration.

2.1.1. Complementation

Complementation refers to how we see colors in relation to other colors. When colors occupy the opposite ends of the color spectrum, they cause people to consider an attractive design visible by establishing a happy environment in which to can inhabit the eye rather than adjusting to a certain area of the color spectrum. There are three common uses of complementation: the Triadic, Analogus and Split Complimentary color scheme[9]. Complementation can take you to new heights of design sophistication when you can begin to master the complexity of color combinations.

- *Triadic color scheme*

Composed of 3 colors on separate ends of the color spectrum. There is a very easy way to create a Triadic color scheme: Take a color wheel and choose the base color. Draw an equilateral triangle from this point. The three points of the triangle will form your tri-color scheme. By using an equilateral triangle, you can ensure that the colors have an equal vibration and compliment each other accordingly.

Fig.1.   *Example   of   triadic   color   palettes,   source   of   image:* https://www.slidescarnival.com/how-to-pick-the-best-colors-for-your-presentation-plus-10-color-combination-ideas-to-get-you-started/14686

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[9]   ***. 1998. *Combining   Colors - Analog, Complementary, Triad - Colors on the Web.* http://www.colorsontheweb.com/Color-Theory/Combining-Colors access: 16:04.2021, 21:00.

- *Analogus color scheme*

An analogus color scheme is based on a careful selection of colors in the same area of the color spectrum. Usually, the colors are differentiated by their vibration and their contrast compared to the other.

Two examples of an analog color scheme are:
- yellow and orange shades;
- a monochrome selection.

Fig.2. *Example of analogus color palettes, source of image:* https://www.slidescarnival.com/how-to-pick-the-best-colors-for-your-presentation-plus-10-color-combination-ideas-to-get-you-started/14686

- *Split complementary color scheme*

This color scheme is based on providing a complementary color gamut: two colors are chosen from opposite ends of the color spectrum. By doing so, the designer is given more freedom in design, while benefiting from the visual appeal of complementary colors.
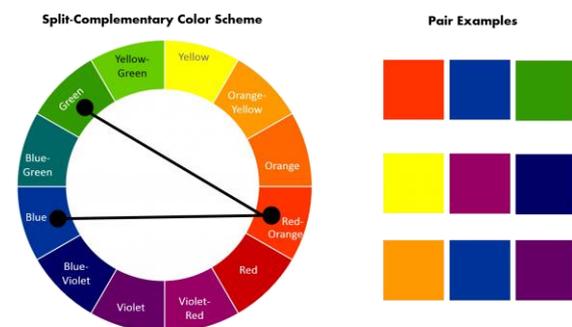
Fig.3. *Example of split-complementary color palettes, source of image:* https://www.slideteam.net/blog/color-wheel-choose-right-color-scheme-powerpoint-slides/

2.1.2. Contrast

Contrast reduces the eye effect and focuses the user's attention by clearly dividing the elements on a page. The most apparent example of contrast is an effective selection of background and text color.

If you ever have doubts, the best practice is to choose a very light color for the background and a very dark color for the text itself. This is an area where color theory is crucial

to using in web design. In most projects, large areas of text are not a place to try to be truly creative - so keep it simple and readable.

Once the readable text is established, the contrast can also draw the viewer's attention to the specific elements of a page. Think about highlighting a textbook: when you want to draw attention to a certain part of the page, make the surrounding area look different from the rest of the text. The same principle applies to Web Design for example: using a variety of contrasting colors can help focus the viewer's attention on certain page elements. If a website has a dark background, focus on the main content with a lighter color.
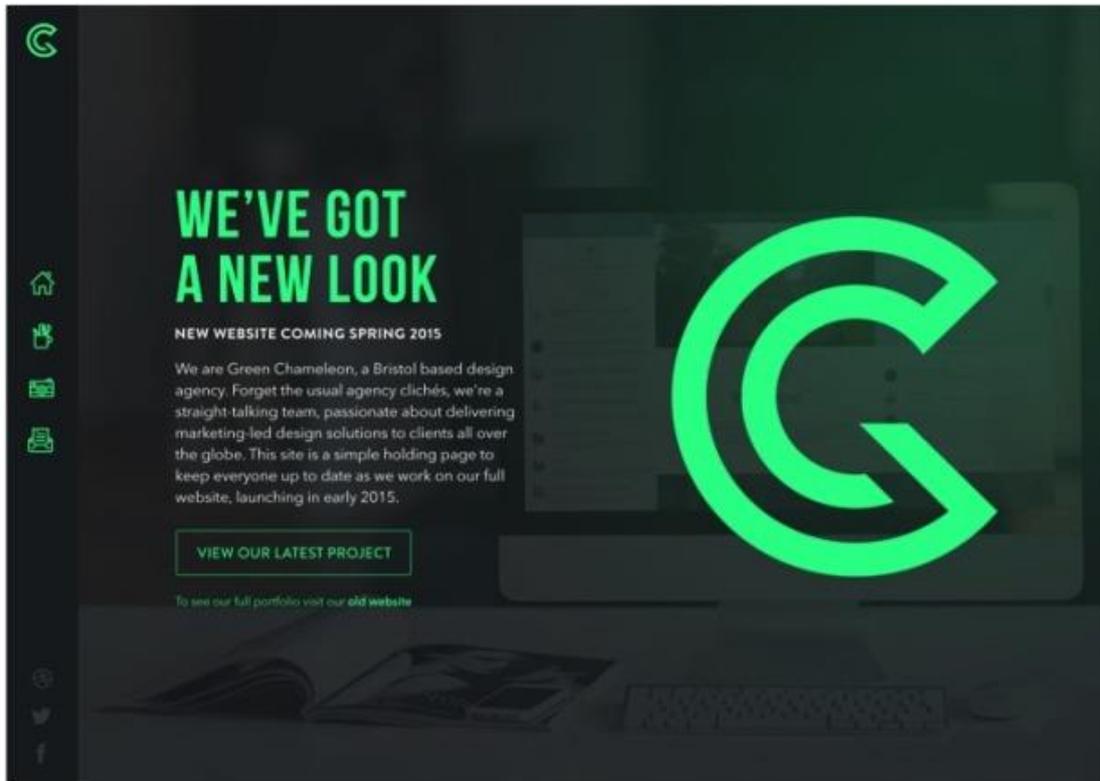
Fig.4.   *Contrast   in   web   design   example,   source   of   image:* https://www.vandelaydesign.com/contrast-in-web-design/

2.1.3. Vivacity
The vibration dictates the emotion of your design[10]. Brighter colors make users feel more energetic because of the design, which is especially effective when trying to advertise a product or invite an emotional response. Darker shades relax the user, allowing the mind to focus on other things. A great example of this is a comparison between CNN and Ars Technica websites. The CNN site has a strong red banner at the top, which leads to increased emotions from users, as they are stimulated by the vibrancy of the design (and the contrast between red, white and black - the main color scheme of the site). Ars Technica uses a darker color scheme for the background and its header to relax the user and focus on their content. Through this, their technical and detailed writing is considered in the foreground of the site. And, more

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[10] D.A. Norman. 2002. *Emotion & Design: Attractive things work better. https://jnd.org/emotion_design/,* access 16.04.2021, 21:30.

importantly, the user has the right to transfer the traditionally reserved mental energy to respond to vibrant colors to understand the content of the article.
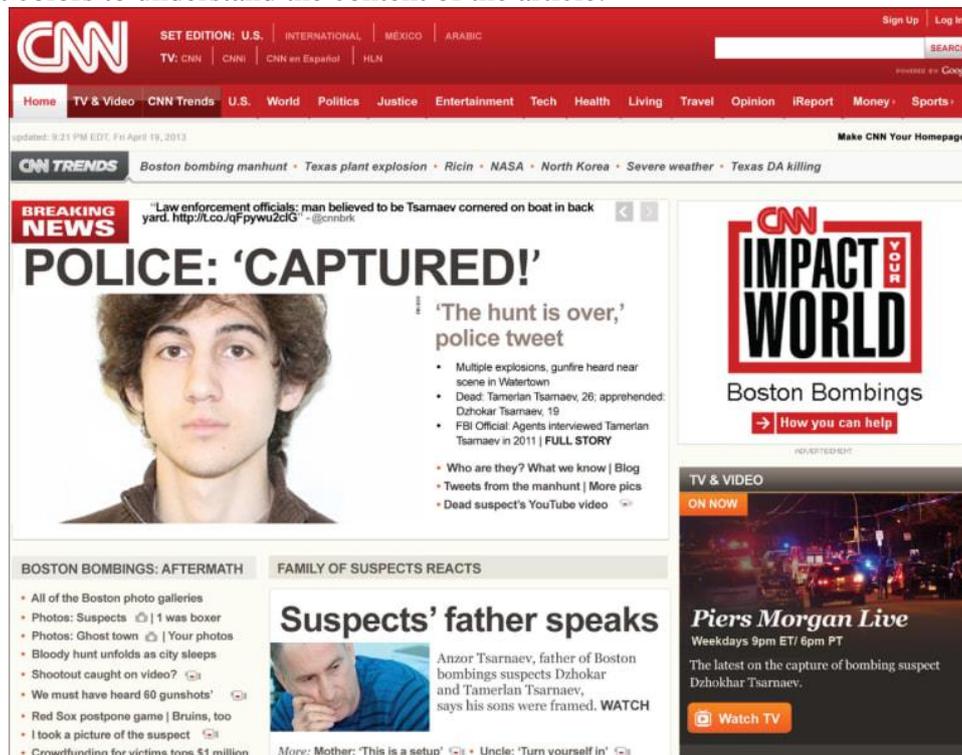

Fig.5. *CNN website image, source of image:*
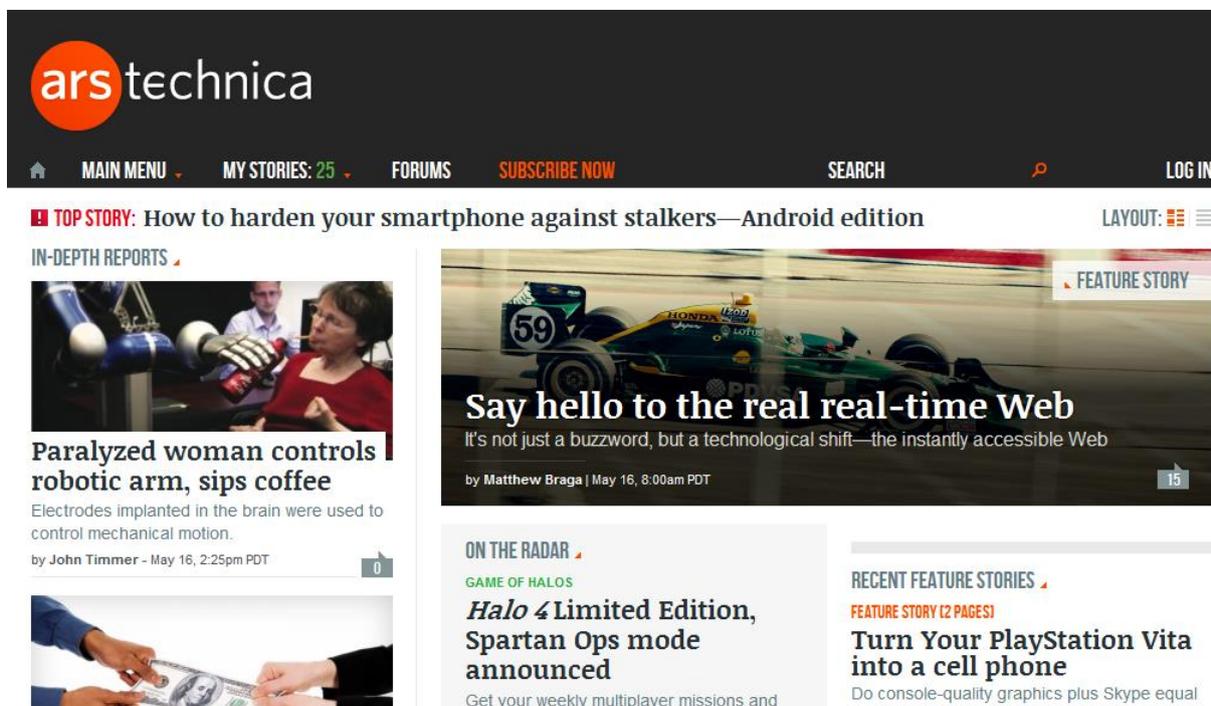https://edition.cnn.com/2015/01/02/world/gallery/cnn-homepage-through-the-years/index.html

Fig.6. *Ars Technica website image, source of image:* https://arstechnica.com

3. Digital tools when working with color

There are several tools available to us that make color selection extremely easy when used properly[11]. And, best of all, they will continue our understanding of color theory.

- *Adobe Color(Kuler)*

A tool developed by Adobe, Adobe Color aims to provide an intuitive way to create a color palette. Each color in the palette can be changed individually or selected as the base color with a few simple clicks. Palettes can be saved and published, and there are a number of excellent community entries on their website. Under each color, export codes (including hexadecimal) are provided. However, the interface can be cumbersome at times, adjusting the vibration of a certain color can change the entire palette (I would like it to have a "lock" feature that prevents other colors from changing).
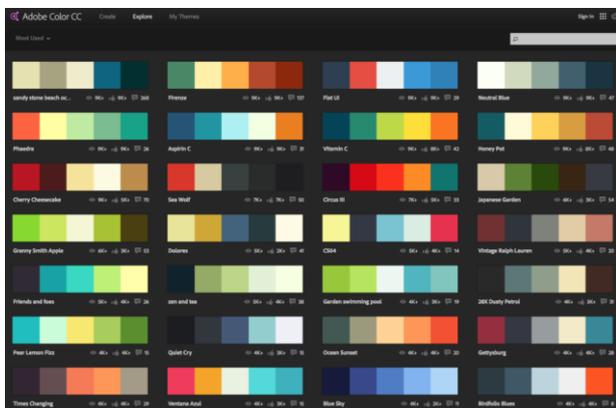

Fig.7. *Adobe Color, source of image:* https://color.adobe.com/create/color-wheel

- *Palleton*

In love with colors, since 2002. A designer tool to create color combinations that work well together. Formerly known as Color Scheme Designer.

Fig.8. *Palleton, source of image:* https://paletton.com/#uid=1000u0kllllaFw0g0qFqFg0w0aF

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[11] Pere. Obrador. 2006. *Automatic color scheme picker for document templates based on image analysis and dual problem.* *https://hpl.hp.com/techreports/2006/hpl-2006-10.pdf%20%20%20access%2015.04.2021,* access 15.04.2021, 21:10.

- *ColorExplorer*

With ColorExplorer you are able to import colors from your own photos, iamges, artworks, create matching color paletts quick and easy and use interactive virtual color decks.
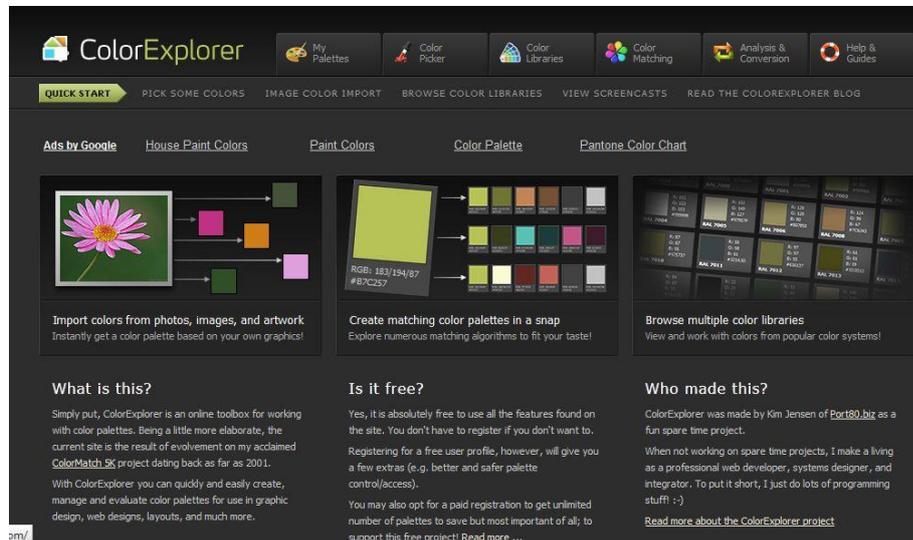

Fig.9. *ColorExplorer, source of image:* http://www.colorexplorer.com

- *Accesible Color Matrix*

An easy tool that allows you to edit color paletts. Accessible Color Matrix makes it super easy to test out potential color schemes for your website and user interface. What makes this tool unique is the ability to test a range of colors rather than just two at a time.

Fig.10. *Accessible Color Matrix, source of image:* https://toolness.github.io/accessible-color-matrix/

- *Palette*

Palette is a tool that you can use to create and sample color schemes in which colors smooth into each other.

You have full editing capabilities in terms of hue and saturation, and adding more color swatches as needed. If you already have a color palette on hand, you can easily import and edit it further to get your desired values.
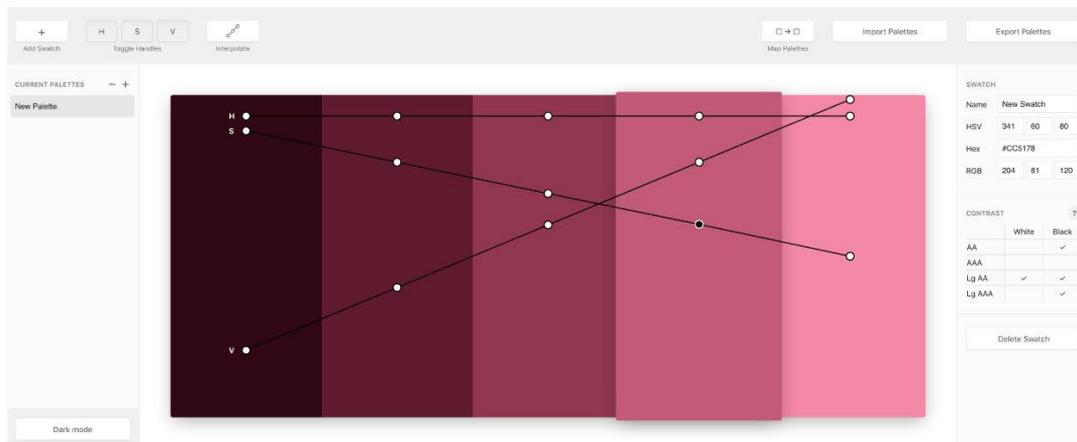
Fig.11. *Palette, source of image:* https://palette.app
- *Color palette generator by Canva*

This is an online tool that is very easy to use either for getting inspiration from many color palettes or create your own using personal images.

Fig.12. *Color palette generator by Canva, source of image:*
https://www.canva.com/colors/color-palette-generator/

4. Conclusions

One of the hardest aspects of working with colors is that sometimes when the colors have not yet been arranged in a design, they do not seem to work well together. However, once applied, their visual harmony becomes evident.

When you work on a design project is important that you remember these:
- The choice of colors on the opposite ends of the spectrum creates a visual harmony for the eyes.

- A high contrast between the elements makes the text easy to read and guides the reader's attention.
- The brighter the colors, the more mental energy they will consume.

Using tools like Adobe Color and Palleton makes your life easier and prevent you from becoming frustrated within the learning and creative process.

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