The rules of graphic design for color blind patients in social media

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ABSTRACT:

Today, the world is experiencing a new phase of intellectual and technological development in which innovation is mixed interactively in all aspects of life and everything that exists around us. Through social media, we discover and learn new information, share ideas, and interact with others.

Graphic design has an important role through social media. It is important in attracting the user's attention because social media users are constantly increasing and there are color-blind people who use social media sites.

Color blindness is a term that means a person suffers from a defect that causes him to lose the ability to see one of the following three colors: red, blue, or green, or the color resulting from mixing them together. 8% of men and 0.5% of women suffer from some form of color blindness.

Methods and rules of design through social media for color blindness It is important to understand that color blindness is not equivalent to seeing only in black and white, which is a decreased ability to distinguish between shades of some colors. These colors tend to blend into each other, resulting in visualizations that may look like this:

The requirements for implementing designs through social media for color blindness are selecting colors that are friendly to color blindness, the method of writing and drawing, the placement of textures, lighting, and brightness.

Keywords

Web Design; Color Blind; Protanopia; Deuteranopia; Tritanopia; Contrast; Color Blind; Mobile Application.

Introduction:

The graphic designer considers these designs for color blindness, and the designer must see with the eyes of color blindness, even if it is difficult, but it has a strong and effective impact through social media sites and graphic designs to suit all browsing audiences. It considers modern design techniques, interactive designs, and design rules via social media.

Social media marketing first started with publishing. Businesses have been sharing their content on social media to drive traffic to their websites. But social media has matured beyond just being a place to stream content. Nowadays, businesses use social media in a myriad of different ways. For example, a company wants to understand how it performs on social media to analyze its reach, engagement, and sales by publishing custom, social media-compliant graphic designs using an analytics tool (Social Media Analytics). Any company that wants to reach a specific group of audience on a large scale can run social media ads that are highly targeted to the target audience and age group as well.

Social media sites allow people to interact with each other by sharing information on websites and applications designed to allow people to share content quickly. Social media is based on the Internet and provides users with an easy electronic exchange of personal information and other content such as videos and photos. Social media is used by individuals. To stay in touch with friends, search for different job opportunities, and find people from all over the world, this is why it is important in daily life, and the world has become like a small village.

Research problem:

- How can a graphic designer take into account color blindness patients in designs via social media?

- What is the importance of the graphic designer's role in designing social media sites and their significant development?

- How can traditional graphic designs be developed in various applications that excite the recipient who has color blindness, attract attention, and convey the communication message clearly?

- How can interactive applications be designed to target a specific age and cultural group through social networking sites?

Research importance:

The importance of the research came in casting a role on creative methods of communication through social networking sites and user interaction and designs suitable for patients with color blindness. Social networking sites are a means that saves expenses, and the advertisement reaches the recipient quickly, and there are multiple age groups and multiple cultures that use it. Social networking sites and communication through which it is easy to target these target groups and customers and the possibility of communicating with them directly and quickly, and advertisements can be made that reach all parts of the world in a certain period or a specific event.

Many interactive applications do not consider colors or writing for people with color blindness when browsing social networking sites.

Research aims:

- Explaining ways to take into account appropriate colors in design for people who suffer from (color blindness).

- Explaining the importance of electronic advertising in the communication process through social networking sites.
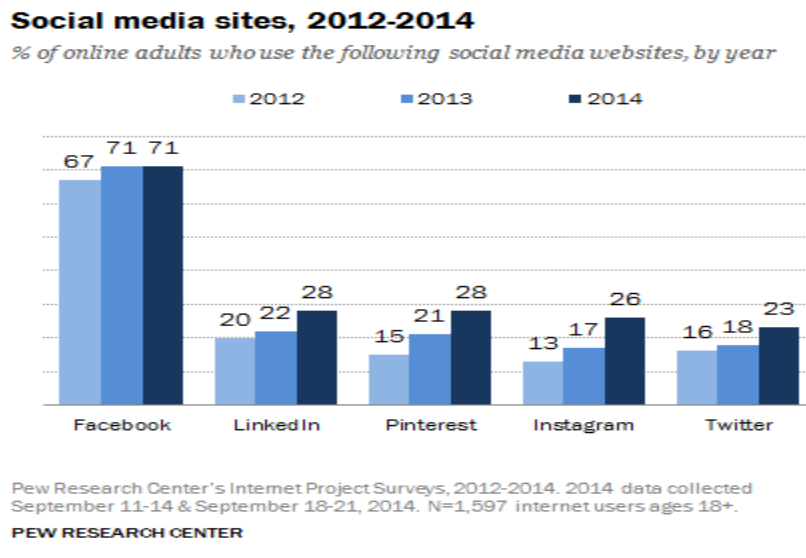
- Studying the design rules to achieve interactivity in advertising by using some modern effects in programs (AI, PS, IN, AE) to create interactivity in advertising.

- Explaining how to target all groups and ages through social networking sites.

Search limits:

- Time limits: from 2010 to 2023.

- Spatial limits: available from countries around the world.

Research Methodology:

The research relies on the historical and descriptive approach

Social media sites, 2012-2014
% of online adults who use the following social media websites, by year

Pew Research Center's Internet Project Surveys, 2012-2014. 2014 data collected September 11-14 & September 18-21, 2014. N=1,597 internet users ages 18+.
PEW RESEARCH CENTER

In September 2014, 52% of online adults use two or more social media sites. More than half of online adults ages 65 and over use Facebook, with 60% accounting for 31% of all seniors. Half of 18-29 year olds use Instagram (53%) and half (49%) of Instagram users use the site daily. The share of Internet users with university education using LinkedIn reached 50%. 42% of female internet users now use the platform, compared to 13% of male internet users.
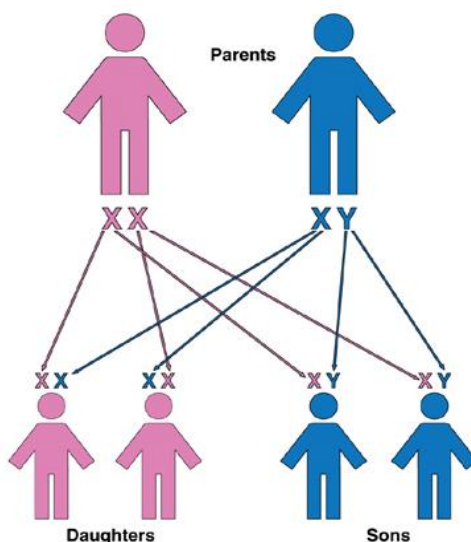
This means, if one or both parents suffer from some type of color vision deficiency, there is a chance that their children or grandchildren will have the same vision impairment. Chance is related to the severity of the type of color blindness because there are different chromosomes involved in seeing colours. There are many different parts of the genetic code. Also, red-green color blindness is a sex-linked recessive trait and blue-yellow color blindness is an autosomal dominant sex-linked trait: encoded on the sex chromosome. X, while men have only one of them (XY) compared to women (XX).

There are different types of colour blindness and in extremely rare cases people are unable to see any colour at all, but most colour blind people are unable to fully 'see' red, green or blue light.

The most common forms of colour blindness are collectively known as 'red/green colour blindness'. Although 'red/green colour blindness' is a common term, there are different types and severities. There is a huge myth that people with colour blindness

- only can't 'see' red and green
- only confuse red with green, or
- see reds as greens and greens as reds

None of these statements are true!

Being 'red/green colour blind' means people with it can easily confuse **any** colours which have some red or green as part of the whole colour. So someone with red/green colour blindness is likely to confuse blue and purple because they can't 'see' the red element of the colour purple. See the example of pink, purple and blue pen cases above to understand this effect.
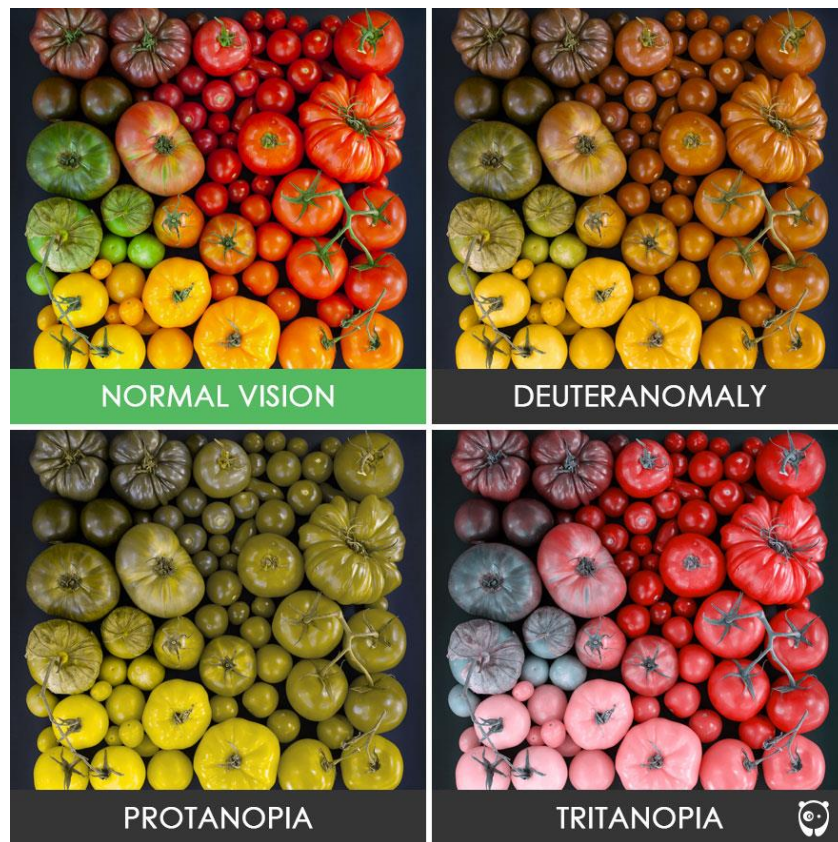
Explains vision types of color blindness.

Colors are often confused The following little story happened a few years ago. Someone was suffering from red color blindness. This is a true story. It goes like this: I was standing on a balcony with a few friends on the fourth floor, looking out at the grass fields below us. After a while, a friend of mine asked, why is a fire hydrant standing in the middle of a field with no path nearby. She looked down and asked, "Which fire hydrant?" - Silence - Laughter. "Don't you see that orange fire hydrant in the middle of the field? It stands out clearly with the orange!" I couldn't

see it. Only a short while later, as I scanned the field for a fire hydrant, I found it. But not because of its color but the structure of it. This story is very typical in that orange and green represent some of the big color problem for red-green blind people. But not only those colors are mixed. Colors from an entire color spectrum can cause problems in terms of not being able to differentiate between them if you are color blind.

The figure shows the book "Ishihara Color Test"

Color blindness testing occurs in order to determine if a person suffers from the inability to clearly distinguish between colors. Color blindness itself is not a form of blindness it is merely a disorder that affects a person's ability to distinguish certain colors. There are many tests available to help anyone with color blindness. One of the most common tests for color blindness is the Ishihara Color Test, which was introduced in 1917 by Dr. Shinobu Ishihara. This test consists of colored dotted panels with each panel containing a number or squiggly line. While taking the test, the person must best answer the question of the number that appears on the board and/or determine the path the line takes.

Colors of confusion

The severity and type of color blindness can be very different. Severe red color blindness is not easily distinguishable. It is not only the primary colors that cause red and green problems. This is the combination of the red part in the colors that makes the colors indistinguishable. Moving around in front of a computer screen or flipping the screen back and forth can change color perception a lot. Also, if you print it out, the colors are perceived very differently especially by blind people.

Guidelines for Designing a Better UX for Color Blind Users

These UX Design Tips to Maximize Conversion Rate would help you design a better web experience for your color blind audience and facilitate ease of use for them:

1. Color Combinations to Avoid

Some color combinations are especially hard on color blind individuals and thus should be omitted from your designs. The site wearecolorblind.com offers plenty of insights for designing with the color blind in mind and has deemed several color combinations unsuitable for these individuals, including Green & Black, Green & Grey, Blue & Grey, Light Green & Yellow, Green & Blue, Blue & Purple, Green & Brown, and Green & Red.

indistinguishable colors in color blindness

http://mkweb.bcgsc.ca/colorblind
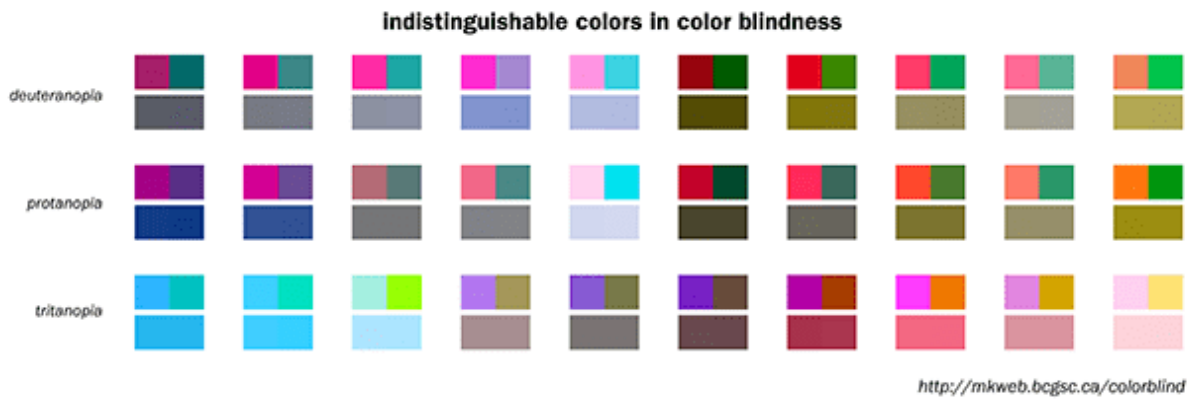
2. Make it monochrome

One of the most definite ways of avoiding issues stemming from color blindness is to employ multiple shades of a single color rather than using multiple colors in your design. After all, minimalism is the new sexy, isn't it? Colors having too similar a hue or having the same temperature are hard to tell apart. Nobody's asking you to create a black and white website but viewing your website in greyscale mode helps you envisage how it would appear to your color-blind audience. Google Maps accomplishes it perfectly as it uses colors of different hues, in addition to using green for no traffic and red for busy, to allow color blind people to see the differences.
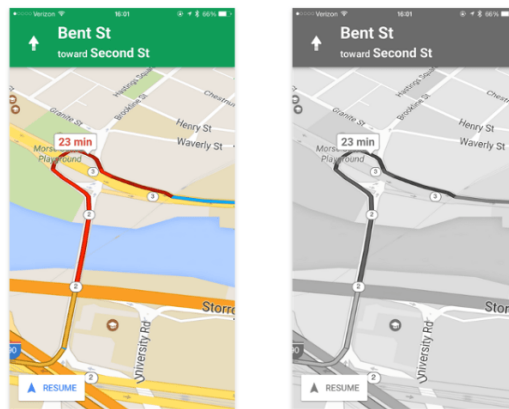
3. Use High Contrast

Color blind people are able to perceive differences in brightness, saturation, and hue, as well as contrast. Web designers can leverage this to their advantage, since a plethora of people afflicted with this condition fare better with bright colors than dim ones which have a tendency to blur into one another. For instance, the game Word Feud only uses those colors for its tiles which are easy to distinguish for individuals with color deficiencies. Go MediaZine has a good article replete with examples on good and bad contrast.
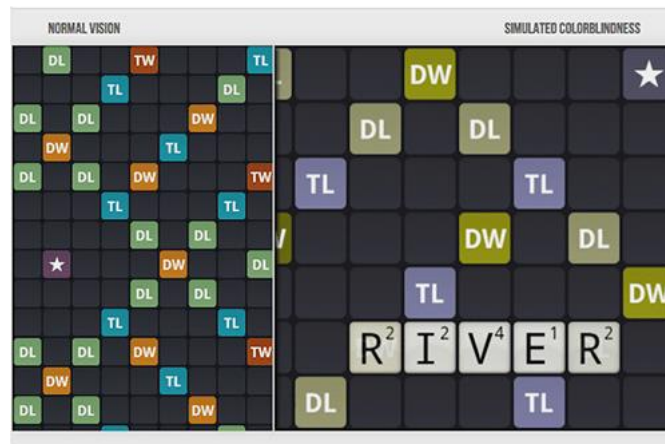

4. Use thicker lines

People with a mild case of color blindness are often able to see a color if there's ample "mass" of it. Therefore, a less than sufficient thin line of color won't show up as the right color to them. Even better, it's more prudent to use texture instead. Especially in infographics and maps, texture can be used in addition to color to distinguish between myriad objects. For instance, if we run the image above on the vischeck simulator, a Protanope or a Deuteranope would easily interpret it.

5. Use both colors and symbols

WCAG 1.0, WCAG 2.0, and Section 508 all stress upon the fact that color shouldn't be the sole medium to convey information. According to Section 508 , Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup."

Color shouldn't be relied upon to convey a message, for instance, color blindness may impair a person's ability to decipher common red error messages, such as "watch out", "warning", and "bad". As a good measure, designers should add in symbolic elements in addition to color-coded text to get the point across to a diverse audience and capture their attention. The error messages attached to Facebook's form fields are great examples of this technique.
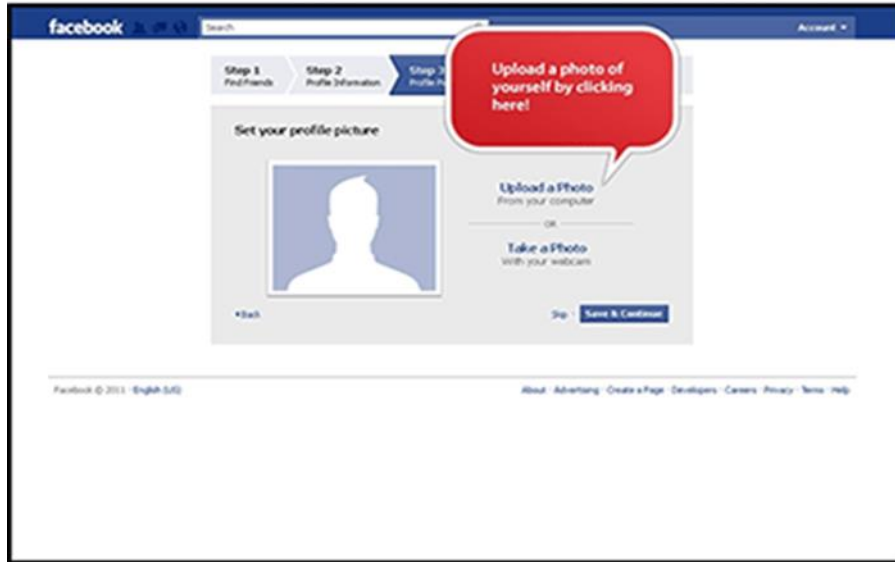
In addition, color-coded text can be supplemented with descriptive text to help such individuals make sense of the text. Gap is one such brand which solves the problem of using color to portray myriad options available in a product by adding a text label beside each color.

Color filter with labels is easy to use, especially as seen by someone with protanopia. This helps individuals with normal vision as well, since some colors such as navy

blue and black are hard to tell apart on a screen. Adding text labels makes it hassle free to differentiate similar looking colors and takes the guesswork out of it.

Similarly, often primary buttons are presented with color alone. Instead, consider leveraging icons, borders, contrast, boldness, placement, and size, within the confines of your brand guidelines, to help detection. For instance, Kidly uses iconography, color, and size to accentuate its primary buttons.
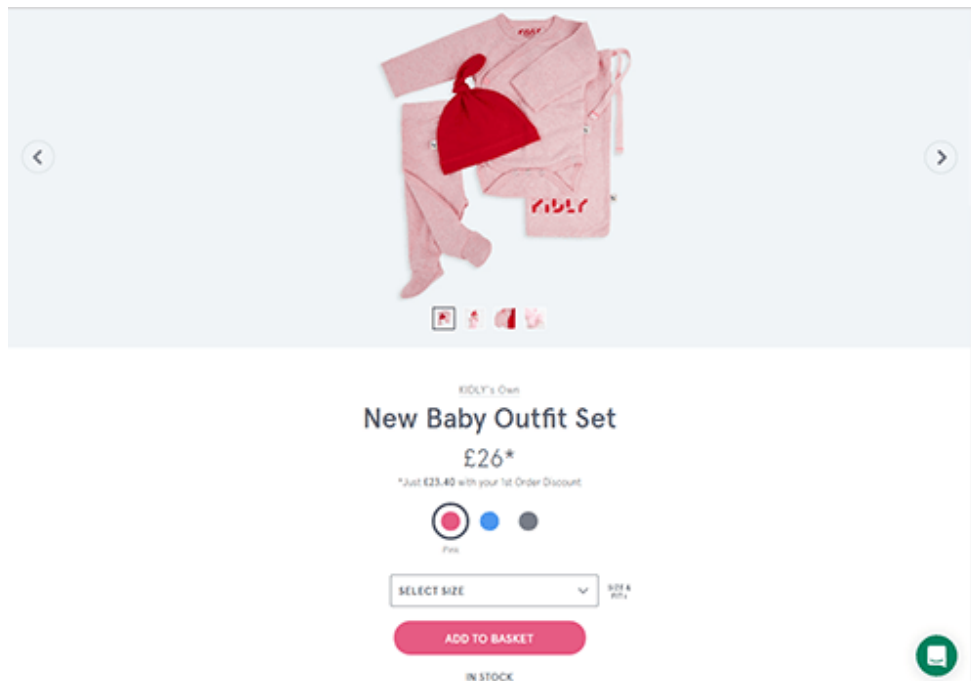

Another option to identify interactive elements is to wean off color and introduce some other visual change between their different states. For instance, while we are accustomed to buttons that change colour on hover, buttons with borders fare better, such as above. Changing the appearance of buttons make them stand out and shows users which elements are interactive.

6. Modifying Brightness, Saturation, Hue

Similar to altering contrast, tweaking the brightness, saturation, and hue of colors allows designers to show definition and help end-users differentiate between various elements without using a plethora of different colors. By using one color, or even a small set of colors, changing either the hue, brightness, or saturation can reveal a distinguishing contrast within samples of the same color. This technique lets designers incorporate color throughout their designs as if adding a new color to the mix each time, without compromising the aesthetics. Each sample of the color is then perceived by the color-blind visitors as a different looking part of the design. For instance, we started out with the same color below but turning up the hue a notch produced the color on the right.
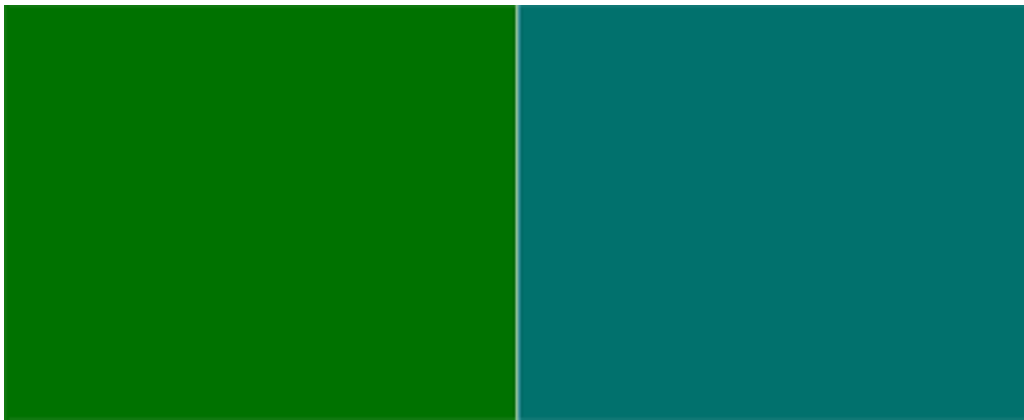
7. Easy to Spot Links

Links on a web page should be easy to spot for everyone, including your color blind audience. Thus relying on color alone is not the best option.

The screenshot of the UK Government Digital Service (GDS) website above shows how someone with achromatopsia (the inability to see color at all) might be left scratching their heads when trying to find links on a web page. The only way left for these users is to hover with their mouse at every word, waiting to see if the cursor would indeed change to a pointer. This becomes even more difficult on mobile as they have to resort to tapping on text to make a page request. Links should be underlined, or even better incorporate icons, to ease navigation.
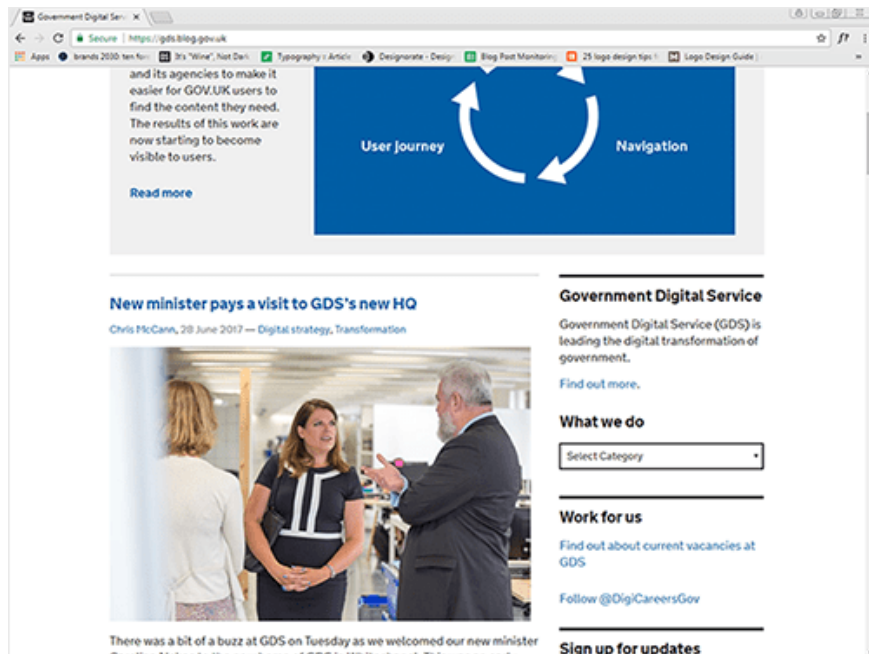
## 8. Problematic Colors shouldn't be Used Side-By-Side

Depending on the type of color-blindness, a lot of original problematic colors are automatically replaced by other hues. That is, for Protanopes or Deuteranopes, greens and reds become brownish, with greens being a tad lighter than reds. For Tritanopes, blues appear lighter and yellows appear pinkish.

Now imagine a scenario where you have picked exactly these colors for your design's color theme, namely blue, pink, yellow or brown, green, red, and then placing such colors side by side would inadvertently create a "blending effect", with greens or reds melting into shades of grey or brown, and the greys and browns retaining their original colors.

Even worse, if such colors are combined by themselves as the color of background and superimposing text, or in graphs to convey information, it would be the height of reckless design decision. When designing for a color-blind audience specifically in mind, not using such problematic colors is the best option.

9. Photoshop Testing Resource

Adobe Photoshop allows you to view protanopia and deuteranopia versions of your images. With the image to be tested open in Photoshop, select View → Proof Setup > Color Blindness – Protanopia-type to activate the Protanopia test. Select View → Proof Setup > Color Blindness – Deuteranopia-type to activate the Deuteranopia test.
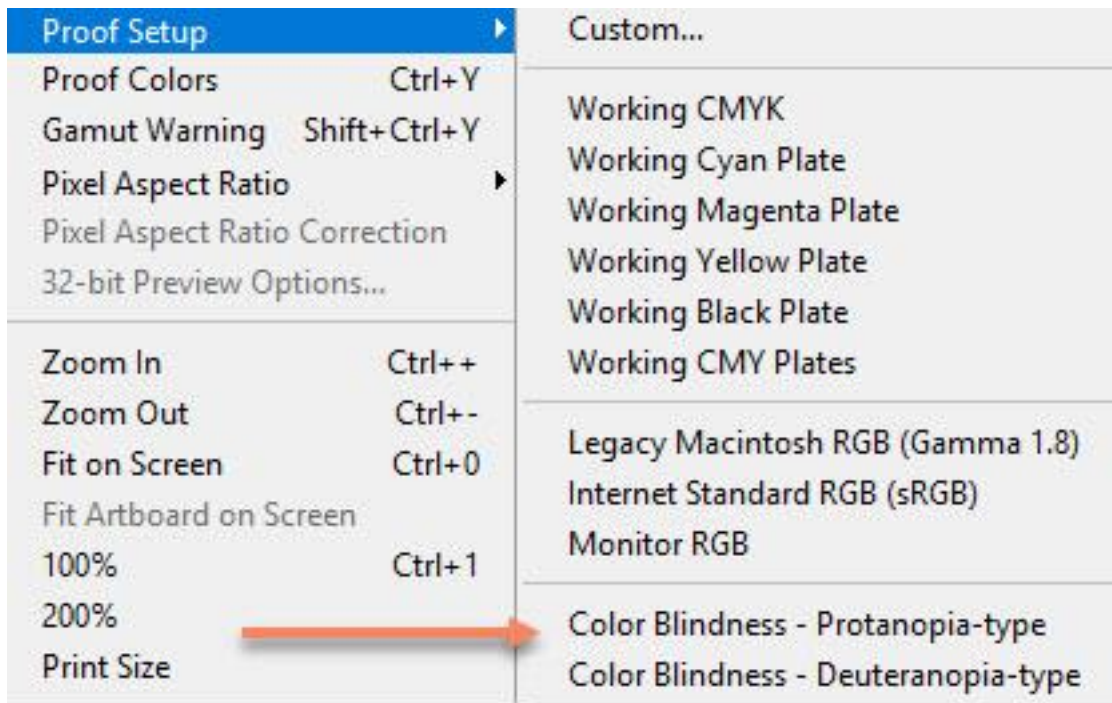
Conclusion

Designing for the colorblind is not often a bed of roses for designers who aren't colorblind themselves, and thus cannot actually comprehend the struggles of their less fortunate end-users. However, designing for the color blind audience in mind is indispensable now a days as color blindness doesn't only affect a handful of people but actually a dilemma plethora of your end users have to contend with day after day.

Results:

The research reached several results, including:

It was found that it takes only 50 milliseconds for the human eye to form an opinion of the visual content of a message, and with only 0.05 seconds passing to deliver the visual message, so social media graphic design must focus on what is important.

It has become clear to us that it is a mistake to believe that color blindness is limited to two colors. Color blindness is not only related to two colors that cannot be distinguished, but color blindness includes the entire color spectrum that the patient is affected by.

Interactive graphic designs should not start appearing suddenly all at once. They should go through a color comfort stage for color blind patients because animation and content that moves can cause discomfort and physical reactions, and luminous design with an imperfect color is avoided.

The designer can change the default colors of text, background, or links, and change the default font styles to make content easier to distinguish and read.

Recommendations:

The research reached several recommendations, the most important of which are:

Inviting technical institutions that teach graphic design and interactive design curricula to cooperate with the Ministry of Health to hold a practical conference that achieves the desired goal of producing graphic designs that contribute to helping color-blind patients so that they can see elements on the screen better.

The research also recommends inviting educational institutions that teach web page design to include the problem of color blindness in their curricula for teaching students.

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