

**Article Info:**

Published Date: 19 October 2022

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## **DESIGNING AN ASSISTIVE COLOR CODE FOR THE VISUALLY IMPAIRED WITH BRAILLE TOUCH**

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**To cite this article (APA):** Abdul Karim, K. A. (2022). Designing an Assistive Color Code for The Visually Impaired with Braille Touch. *KUPAS SENI*, 10(2), 30–38. <https://doi.org/10.37134/kupasseni.vol10.2.4.2022>

**To link to this article:** <https://doi.org/10.37134/kupasseni.vol10.2.4.2022>

### ***ABSTRACT***

The basis of this project is to create a color code using Braille touch specially designed with complete details to be placed on the garment. This study aims to analyze how clothes and Braille affect each other in providing information in the design, how to coordinate clothes according to color by color code, and to overcome the challenges of wearing clothes amongst visually impaired people. This project is to contribute and achieve SDGs 9 and 11 which are related to Industry, Innovation and Infrastructure, and Sustainable Cities and Communities. Braille becomes a major element in designing color code by entering the details required to convey information. It also plays a role in terms of color identifications to visually impaired people using a braille touch that has been designed with various shapes to represent each color code. This information must be on the garment to satisfy the requirements of the visually impaired community. Incorporating fashion elements and components on a color code that focuses on braille touches is a special solution for this visually impaired people. Many struggles the unseemly faced, difficulties include daily clothing identification and clothing choices made without assistance. This color code is focused on functionality and practicality. It is a very practical approach in helping them to dress and to live independently in the future. Raising the awareness of society, upgrading individual thinking, and creating innovative designs for emulated by future generations, and also to make Malaysia a country that helps achieve the goals of SDGs over period and time.

**Keywords:** Color Code; Visually Impaired; Low Vision; Blind; Braille Touch

### **INTRODUCTION**

In general, A person with a visual impairment is someone incapable of self-determining to acquire in whole or part of the needs like a normal person due to physical deficiencies. This level of visual impairment has several types of groups that are divided into four levels using the abbreviation 'B' letters which represent blind and one to four digits according to the degree of blindness. 'B1' means a person who is completely blind and 'B2' to 'B4' means half-blind and severely blind. This abbreviation is used for blind athletes who are involved in sports for the disabled category. As we all know, the main necessity today is clothing and this is one of the difficulties for those who had a vision problem to recognize the color of the clothing that matches or suits them. When there is assistive information about the color of the clothes for guidance or reference, it makes it easier for them to choose and wear the garment. At the same, it also helps them to be more independent, engage in such activities in privacy and get closer to the fashion world. The appropriate design criteria should be prioritized for comfort and convenience while they carry out the routine of dressing activities. In this study, Braille's touch plays an important role in helping these problems to facilitate their daily lives. With the assistance provided, these visually impaired communities can learn to live independently in their daily activities without any restrictions or help from anyone.

## **CRITICAL ISSUES**

The statistics show an increase in the population of individuals with disabilities in Malaysia. However, the existing facilities do not fully meet the needs of this community, especially those with visual impairments. Clothing is one of the necessities that is an obligation to human beings that are always worn daily and this is one of the difficulties faced by the community of visually impaired people to identify the color of clothing and match it like ordinary people. As stated by Neo Maditla (2018), when the individual is blind, getting dressed will presents challenges for them and it is difficult for us to understand the situation. When it came to choosing the clothes, they have no alternative like us, instead of the difficulties they will confront.



**Figure 1.** The difficulties when choosing clothes by the visually impaired (Khairi Karim 2022)

Based on Raghad Alali (2017), in their lives, people with visual impairment have barriers that make them feel less independent and not the same as those who can see. In particular, those with these vision problems are unable to see the information of the clothes they want to wear in general and make this group have to rely on the help of others or have to choose the same color and pattern for all their clothes. Incorporating fashion elements and components on a garment that focuses on Braille touches is a special solution for this visually impaired people. It not only helps in their daily activities, but the garment they wear with color code can provide a function for their use. The value of the color code can also be seen through the texture and material used. no alternative like us, instead of the difficulties they will confront.

## **THE SUSTAINABLE DEVELOPMENT GOALS (SDGs)**

The Sustainable Development Goals (SDGs) are a collection of 17 global goals set by the United Nations General Assembly in 2015 for the year 2030. In contribution to SDGs, this research supports the goals. The basis of this project is to achieve SDGs 9 and 11 which are related to Industry, Innovation and Infrastructure, and Sustainable Cities and Communities. Designs that create quality, reliable, sustainable, and resilient infrastructure can support human development and economic prosperity by focusing on affordable and equitable access to all societies including persons with disabilities. Providing safe and inclusive universal access especially for people with disabilities. This poses a potentially positive impact that can be seen inside or outside the country.



**Figure 2.** The SDGs 9 and 11 to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation with make cities and human settlements inclusive, safe, resilient and sustainable (United Nations 2018)

A community of disabilities who strives to live a life like a human being without ever despair. Hence, it symbolizes a strong self-reliant value regardless of what people see and say to their community. A collection of the garment that adds to the nature of fortitude, strength, courage in themselves. Without feeling ashamed and always continue to live with the existing facilities. Raising the awareness of society, upgrading individual thinking, and creating innovative designs for emulated by future generations, and also to make Malaysia a country that helps achieve the goals of SDGs over period and time.

### PRODUCT REVIEW

María Sol Ungar is a young fashion designer who hails from the province of Neuquén, Argentina. She moved to Buenos Aires City and built her brand, Sónar. The uniqueness of this brand is clothes that are created specifically for blind people who weren't heard in Latin America.



**Figure 3.** The designer, María Sol Ungar (Cinthia Di Ciancia 2017)

She started this study in special education School N ° 7 by interviewing some people who were visually impaired and begin to ask a variety of questions. She finally managed to end it with a collection of useful and unique clothing. This special clothing designed for blind people has privileges features such as pockets to place their wand and texture that is easily felt. Furthermore, each of these clothing has a label written in Braille and the colors are shown through embroidery or buttons.



**Figure 4.** The collection used Braille embroidery (Cinthia Di Ciancia 2017)

In July 2016, she was nominated to the City Government Entrepreneurial competition, named #Potenciate. Later, she was invited to take part in a fashion exhibition at the Hotel Sheraton in September 2016. This event includes all involved blind people such as presenters, models, and also the musicians. Because of this she became known and had space in the media. Her collection also featured on runway shows at the International Congress of the International Association of Image Consultants (AICI) held in May 2016 in Mexico.

## **METHODS**

In this study, the researcher has chosen the Malaysian Association for The Blind (MAB), National Council for The Blind Malaysia (NCBM), Society of The Blind in Malaysia (SBM), and Malaysian Foundation for The Blind (MFB) as locations to obtain some factual information about the population of blind individuals registered under the organization. There are various artifacts in the fulfillment of the required information such as research that has worked with these organizations, activities that have been carried out, and member information required for the interview session for this case study.



**Figure 5.** The Malaysian Association for The Blind and National Council for The Blind Malaysia (MAB 2019; NCBM 2019)

This study uses primary and secondary data. Both methods were used to collect the required information. Through this method, it will depend on data collection to interpret the results. The selection of this method is because the collection data is easier to understand and interpret the existing facts. It also makes it easier in terms of explaining and analyzing. In Malaysia, people with vision problems are very limited and their groups are difficult to find.



**Figure 6.** The Society of The Blind in Malaysia and Malaysian Foundation for The Blind (SBM 2019; MFB 2019)

For primary data, appointments were made for interview sessions with several members from selected organizations. First, the researchers studied this issue through the internet to prepare some questions to be asked about the current problems in Malaysia. In secondary data, the collection of the necessary information is used through books, journals, articles, websites, and blogs to look into the images and discussions among the society.

## ANALYSIS AND FINDINGS

Based on this study, visually impaired people experience various difficulties in living daily life like normal human beings. In undergoing research about technologies that can identify clothing only using gadgets by the visually impaired, this community is still using manual methods to choose to clothe, match it, and wearing clothes. The purpose of this study is to help these visually impaired people undergo their daily activities related to clothing to read color codes. It simplifies the process of wearing clothes and how to identify the color of clothes more easily and quickly.

**Table 1.** The list of color codes that represent each color

COLORS	CODING
Black	• = B
White	••• = W
Choco (Brown)	•• = C
Nude (Beige)	••• = N
Magenta (Pink)	••• = M
Yellow	••• = Y
Dijon (Gold & Bronze)	••• = D
Orange	•• = O
Red	••• = R
Purple	••• = P
Aqua (Blue)	• = A
Teal (Turquoise)	••• = T
Green	••• = G

This study maintains a manual method to facilitate the visually impaired people to identify the color code on clothing, it is easier for people with vision problems to use this method because they have been practicing the manual method since the beginning. However, this method is improved to work more effectively than before.

## DESIGN CONCEPT

As a result of observations from the case study, the information needed by the visually impaired community is a color code that can identify colors and how to match clothing. The material used, namely PU fabric, plays an important role in enabling the care of the color code and is suitable for use on the surface of any garment fabric. This information should be on the garment to meet the requirements of the visually impaired community.



**Figure 6.** The color codes of Orange, Teal and Nude (Khairi Karim 2022)

Braille characters become a major element in designing color code by entering the details needed to convey information. This idea was generated through responses from respondents as well as studies conducted in the literature. The formation of Braille letters to represent each color code corresponds to the visually impaired person's understanding to receive the information.



**Figure 7.** The 13 color codes formed according to the first letter of the name for each color to be coded (Khairi Karim 2022)

Braille embellishment is the main technique used in this study. The function of Braille embellishment is to inform the wearer about the color of the garment through a code. The color code designed specifically for the visually impaired community is to tell about the color of clothing by touching and feeling the Braille characters. It can provide details directly to the user about the color through color code and the required information via Braille.



**Figure 8.** The color code placed on the garment to identify the color of the garment (Khairi Karim 2022)

## INNOVATION AND INVENTION

This project has been recorded in the Copyright Register as provided under Section 26B, Copyright Act 1987. The project has participated in the Invention, Innovation & Design Exposition (IIDEX) 2019 and was selected for the Product Pitching Competition. Apart from that, the project has also participated in the 2nd Sabah International Virtual Innovation & Invention Competition (SIVIIC) 2022 and won the Silver award for both competitions. IIDEX is an international competition and exhibition organized by Universiti Teknologi Mara Shah Alam, Malaysia. This competition and exhibition aims to facilitate students to improve research and innovation and commercialize research products and technology. This activity is themed “Commercialization of Innovations for Community and Economy (CICE)” which focuses on social innovation that can be invested and commercialized.



**Figure 9.** The certificate of participation, Silver award medal and pitching competition (Khairi Karim 2019)

The Department of Research, Industrial Linkages, Community and Alumni (PJIMA), UiTM Cawangan Sabah hosted the 2nd SIVIIC, with the theme “Turning Covid-19 Uncertainty into Opportunity”. The annual event provides inventors and innovators a powerful platform to showcase the latest inventions, products, and designs of innovative ideas and products to connect with industry players, paving the way for future collaboration and commercialisation.



Figure 10. The copyright of the product and certificate of Silver award (Khairi Karim 2022)

## CONCLUSION

The eye is a primary use on every human body. Loss of vision has a big impact on each individual. A person is deemed to be visually impaired when eyesight is better than 3/60 after correction with any current device such as spectacles and so on. The visual field level is less than 10 degrees on both eyes. The facilities for visually impaired people nowadays are still marginalized. Various efforts are being undertaken by the Malaysian government to meet community needs, but it still does not include the entire Malaysian society which means excluding the disabled. Various improvements need to be implemented to ease the burden of a blind. With the government's actions to balance the needs of these two societies, it can improve people's perception of issues related to the community of persons with disabilities. In this study, what that is trying to convey is, even though this community is blind, this group has the same rights as ordinary people and with the help of society, these special groups can live their life independently as a conventional society. The attention of Malaysians is very much needed to make this community stand as normal people domestically and internationally.

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