Visual communication analysis the effect of signs and colors on traffic safety in Jakarta

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Abstract. About 90% of the information needed for driving is received visually by the driver. Only a little information is received with hearing (horns and shock markers) and a sense of touch (tactile markers and rough roads). Most of the information they get is visual. The two most common equipment used by technicians to give information is signs and markers consisting of signs, colors, and words. Traffic signs are elements defined as a special set of code labels intended for traffic users, which are in a vertical field for traffic areas. It is a basic means of communication between authorities and road users. Standards and guidelines suggest the use of words and color codes that are appropriate for conveying the different intensity of hazards. Red, yellow, and blue indicates a decrease in the intensity of the danger. Likewise, danger, warning, and attention show the danger in decreasing intensity even though some studies find no significant differences in the hazard assessment of warning and attention words. Signs and color codes used in our study are capable of giving meaningful meaning, warning, attention, thinking, and notification. For colors, it will be red, yellow, green, white, blue, green, and orange. We will evaluate perceptions of implied danger and language effects.

Keywords: sign, color, Jakarta, shape

1. Introduction
Road safety is an issue that tends to emerge from year to year [1], and now it has become a global problem. It is not merely a matter of transportation but has become a social problem. It can be seen by the announcement of the “Decade of Action for Road Safety 2010-2010” by the United Nations. In line with the rapid growth of motorized vehicle ownership in Indonesia in recent years, the increase in population, and the variety of types of vehicles, it has resulted in worsening road safety problems [2]. In Indonesia, road safety is regulated in government regulation No. 34 of 2006 concerning roads, Law No. 22 of 2009 concerning road traffic and transportation, as well as the RUNK (National General Safety Plan) of roads. About 90% of the information needed for driving is received visually by the driver through the eyes.

Only a little information is received with hearing (horns and shock markers) and a sense of touch (tactile markers and rough roads). Most of the information they get is visual. The two most common equipment that engineers use to provide information is signs and markers. Both are very commonly used on the road, so they are often underestimated. It makes some signs and line markers used in an irregular, inefficient, or unsafe manner.
There are six correct conceptual concepts in road safety engineering. Conspicuous means that the sign must be visible and easy to read (clear). Words and symbols in signs must be clear and legible [3]. Minimizing the number of words and making sure the symbols are visible from afar. Shapes and colors are important to help drivers make the right decisions early [4]. Comprehensible refers to the message conveyed by the sign. The drivers must believe it, or they will ignore it. Consistent means that the same traffic situation must be regulated by using the same signs or markers.

Consistency reduces the reaction time of drivers and increases their understanding. Correct means there is only one most appropriate sign for a particular situation. Some signs look the same, but only one is really right. Some principles for traffic signs are the two major sign conventions in the world, namely from the United States and Europe. In Europe and the country that is once colonized by European countries, the warning signs are black and white in the red triangle. Command signs are in a red circle in the form of a ban, or a blue if it is a permit. In the United States and countries that follow the United States convention, warning signs are yellow. Command signs are usually black on white signs. Indonesia tends to follow the United States sign conventions for warning signs and Europe for command signs. This method is very acceptable. The most important aspect here is the engineering expertise of the design of visual communication. From the origin of the word (etymology), this term consists of three words.

The design is taken from the word desingno (Italian), which has the meaning of an image. In contrast, in English, the design is taken from the Latin word of designare, which means planning or designing. Communication means delivering a message from the communicator (messenger) to the communicant (recipient of the message) through a media with a specific purpose and purpose. The communication comes from English taken from the Latin 'communis', which means the same (common) [5, 6, 7].

Visual means everything that can be seen and responded to by our sense of vision (eye). It is derived from the Latin word of videre, which means to see. Visual communication design can be said as the art of conveying messages using visual language delivered through the media in the form of design. It aims to inform, influence, and change the target audience's behavior in accordance with the objectives. The visual language used is in the form of graphics, signs, symbols, illustrations/photographs, typography/letters, and so on. The function and purpose of visual communication design color is an important element in the object design.

Because of color, people can clearly display identity, convey messages, or distinguish the nature of visual forms. In practice, colors are divided into two: color caused by the light (additive color/RGB) which is usually used in lights, monitors, TVs, and others and colors made with ink or paint elements (subtractive color/CMYK) usually used in the process of printing images onto the surface of solid objects such as paper, metal, cloth or plastic. The format is another element in the design that defines the size of an object. Using this element, you can create contrast and emphasize the object of your design so that people will know which one to see or read first. Standards and guidelines suggest the use of words and color codes that are appropriate for conveying the different intensity of hazards. Red, yellow, and blue indicates a decrease in the intensity of the danger [8].

It makes it easy for you to convey a very important, important, and less important message reflected in the format of an element. If the element is made better than others, it means that it is very important to say so and vice versa. The texture is a surface display (pattern) of an object that can be assessed by looking or touching. In practice, the texture is often categorized as a pattern of an object's surface, such as carpet, clothes, bark, wall paint, paint canvas, and so forth. The texture is divided into two: real and apparent textures. In the design of visual communication, the texture that is more commonly used is pseudo texture. It can facilitate the work of a designer because it can produce rough textures such as wood, stone, and others without having to use these objects directly. Fine textures are easier to get a subtle impression when using a pseudo (not real) texture.

Space is the distance between a form and another form. In practice, design can be used as an element to give aesthetic effects and dynamics of graphic design. For example, without space, you will not know which words, sentences, or paragraphs are. Without space, you do not know which one to look at first, when to read and when to pause. In its physical form, identification of space is classified into two elements: objects (figures) and background. This element really determines the convenience of reading.
If there is no space in a design, it looks very tight. If there is too much free space on the design, it will look empty.

A designer is required to be smart to use a space in an empty field. A line is a design element that connects one point to another to be in the form of a curve or straight (straight). Lines are the basic elements for building shapes or design constructions. In visual communication, we often use dotted lines and solid lines. Lines also have meaning. Vertical lines have a stable, dashing, and elegant impression. In contrast, horizontal lines have the meaning of passivity, energy, and peace, while diagonal lines have the impression of being active, dynamic, and attractive.

The shape is anything that has a high and wide diameter [9]. The basic forms known to people are squares, circles, and triangles. In the design of visual communication, we will study the basic shapes and derivative forms. While in its nature category, forms can be categorized into three. First, the character is represented in a visual form that can be used to form writing as a representative of verbal language with direct visual form. The symbol is in a visual form representing a simple form of an object. It can be understood in general as a symbol to describe a form of a real object, such as a picture of a person, a star, a sun in a simple form (symbol), not in a real form (in detail).

Real form truly reflects the physical condition of an object, such as detailed human images, animals, or other objects. The principles of visual communication design actually have a reference to art in general because it is related to an aesthetic in art. It consists of five parts. Unity is one of the basic principles of an essential visual system. The absence of unity in a work of art will make the work look fragmented and chaotic, resulting in unsightly work. This principle is the principle of relationship. If one or more visual elements have a relationship (color, expression, direction, and others), unity has been achieved.

The artwork and design must have a balance to be comfortable and not make you nervous. Just as if we see trees or buildings that will collapse, we feel uncomfortable and tend to be restless. Balance is a condition experienced by an object if all workings cancel each other. In the art field, this balance cannot be measured but can be felt. It is a situation where all parts of work are not burdensome.

Proportion includes the basic principles of governance to obtain harmony. To get harmony in work, the right comparison is needed. Basically, proportion is a mathematical comparison in a field. The Great Proportion (The Golden Mean) is the most famous and used today in works of art to architectural works. This proportion uses a Fibonacci number sequence with a ratio of 1: 1.618, it often uses 8:13. It is said that this proportion is a comparison found in natural objects, including the structure of the size of the human body. So, it is considered the proportion passed down by God. In the design field, this proportion can be seen in a comparison of paper size and page layout.

Rhythm is the repetition of regular and continuous motion. In the forms of nature, we can take the example of repetition of motion in the waves of the sea, rows of ants, the motion of leaves, and others. The principle of rhythm is a repetition of the forms. Domination is one of the basic principles of layout that must be present in works of art and design. Domination comes from the word 'dominance', which means excellence. This superior and special character will make an element as a puller and center of attention. In the world of design, domination is often called the center of interest, focal point, and eye-catcher.

Domination is to attract attention, eliminate boredom, and to break the order. The correct concept of design is the particular value of the design work. It means that the first thing we take into account before we make a product design is what concept will be used. Starting from the theme, if the flow is good, the result automatically becomes good. It is also easy to understand by those who enjoy the product. According to experts in everyday life, theories about a character often equate the term with personality.

If it is examined further, the meaning of the character is not the same. Character is an accumulation of characters and a person's personality. In addition to this understanding, there is a great deal of understanding of the character of words expressed by experts. According to Maxwell, characters are far better than mere words.
More than that, character is a choice that determines the level of success. According to Wyne, the character marks how or even the technique for communicating and applying good values into action or behavior. According to Kamisa, the notion of character is psychological, moral, and character traits that can make someone look different. The character can be interpreted as having character and personality. According to Doni Kusuma, character is a characteristic, style, and nature of a person or even character obtained from the surrounding environment.

According to Saunders, the character is the real and different nature shown by individuals. It can be seen from various kinds of attributes that exist in individual behavior patterns. According to Gulo W., it is a personality seen from an ethical or moral standpoint (such as someone's honesty). It usually has a relationship with relatively fixed properties. According to Alwisol, it is a depiction of behavior carried out by highlighting the value (right - wrong, good - bad) implicitly or expeditiously.

Characters are different from personalities that do not involve values at all. The process of forming characters by a person is through a fairly long learning process. Human character is not something that is born from birth. More than that, the character is a form of forging the environment and people who are around the environment. Character is formed through the learning process in several places, such as at home, school, and the neighborhood around the residence. The parties that play an important role in forming a person's character are family, teacher, and peers. A person's character will usually be in line with his behavior. If someone always does good activities such as politeness in speaking, helping, or respecting others, most likely the character of that person is also good. However, if someone's behavior is bad such as lying or saying bad things, the character may also be bad.

2. Discussion
Traffic signs are often also referred to as icons, symbols, or images such as faces, places of worship, directions, vehicles, and written texts. Those are icons that we use every day and represent our knowledge or activities. In the use of traffic signs, many icons are presented in color (sometimes as multicolor images) and monocolor. It is usually a repeating sequence of two to four images. For example, the user signs out of the freeway, which usually contains distance information. However, for designs that are too different from other representations, it can also cause interoperability problems (the capabilities of a product or system whose interfaces are fully expressed to interact and function with other systems, now or in the future, without restrictions on access or implementation). Signs must have two main presentations, which are colorful and may look irregular, even in the form of text, and black and white. More precisely, the presentation of the text is a simple foreground form. The colors are identified by other information, such as setting colors in the text. Meanwhile, the presentation of signs determines the color of characters, object mixing, and color. In other words, when someone changes the color of the text in a word processor, the characters with the presentation will not change.

3. Analysis
Traffic signs are one of the road equipment in the form of symbols, letters, numbers, sentences, or a combination for traffic guidelines. The traffic signs are divided into several types. One of them is warning signs to declare hazard warnings on the road. Warning signs always use yellow as a base color with a firm rectangular shape. According to graphic design analysis, the use of yellow on warning signs gives a meaning for everyone who is in the environment. This symbol means always being alert to all things that can happen in the work environment to compensate for other dark colors or objects that do not stand out.

Yellow is a warm and happy color that creates a sense of joy and desire to play. Psychologically, yellow means optimistic, enlightening, and cheerful. Yellow color stimulates the logical side of the brain and mental clarity. It encourages academic wisdom and ability. It inspires original thinking, creative and neutral ideas. The yellow color is identical to something that shines. Yellow is also usually used to stand out something material in our design. By giving this color to the headline or illustrations, it stands out from the whole design. Too much yellow color can cause saturation, fatigue, fear, overacting, and
domination. It can motivate people to be too critical and control, judge, or attach mentality. The dominating nature of this color with black becomes something elegant and wiser.

Next, prohibited signs are used to declare action prohibited for road users using red color. It provides information that workers or people who are in the vicinity of the work environment must know the danger of the environment. The environment that is given a safety symbol with white background color with a circle and a red line means danger [15]. The addition of black content as a prohibited object is addressed to certain objects.

Command signs are used to declare mandatory requests that must be fulfilled by road users. It always uses a blue color with a box design. There are symbols with a message in it. It can be colored or only black in color. Based on graphic design analysis, it can be interpreted that this color gives information about everything in this environment and must be obeyed by the users.

The signpost is to declare information about the department, road, situation, and so on [16]. Signposts usually use several colors, designs, and different tests depending on the purpose. According to the analysis of the design, the use of green color indicates that the area around it is safe or passable. In its application on the freeway in the city of Jakarta, effective signs must fulfill things such as meeting needs, being able to attract attention, and providing a simple and easy to understand the point.

Based on these considerations, the planning and installation of signs must be uniform for the shape, size, design, and location of the signs. The meaning of the form of traffic signs unconsciously has a psychological meaning behind it. Certain forms make us feel comfortable and easy to receive information in a certain way. Shapes with rounded edges are softer and easier to approach, while shapes with sharp edges represent strength and presence. The meaning of the form is in design science of geometrical form. When thinking about this form, it is the first thing that comes to mind. They include squares, rectangles, triangles, diamonds, circles, ovals, and others. This form is easily recognized and named. Forms with straight lines and angles usually symbolize structure and arrangement, while shapes with curves are softer and represent connections and communities. In natural or organic forms, the shape is naturally irregular and more often than not curved or uneven. Like most things in nature, this form tends to be entertaining and approachable. Represented in the form of rocks, clouds, leaves, and flowers, they are primarily based on nature, but it can be made with elements such as paint clumps or free images created through spontaneity.

Abstract forms are recognized, but they are not real because the form of the organic version is simplified. For example, icons are abstract forms that represent concepts and ideas [17]. The stick figures are abstract forms of a person. Then, triangles are interesting shapes because they can be seen differently depending on whether their sides are the same or different in length, whether they sit on the base or are stable or not. Triangles have the energy and power associated with them because they can show direction, depending on their base. Triangles can give a feeling of tension or even aggression. They can symbolize strength and conflict. They are seen more as a masculine form. Strength, progress, purpose, and direction are all represented by triangles. We see triangles in the pyramids and arrows, not to mention their religious relations, especially with the holy trinity. When the triangle is balanced, it is a symbol of justice, science, and religion.

Circles and ovals tend to send positive emotional messages about harmony and protection. This circle is often used in logos to represent unity, commitment, love, or community. Curves generally, tend to be seen as feminine in nature, while straight-line forms are more masculine. Circles have no beginning or end; circles represent life and life cycle. Circles, along with ovals, are easily found in nature with the sun, moon, earth, fruit, and flowers. The circle has freedom of movement, such as a wheel or balls cheerfully spinning. Their movements may also represent strength and energy. Because of their curved lines, ovals and circles are graceful and complete. They give a sense of integrity and perfection. They are not used in the design for spatial reasons, but when used, they attract more attention than the right-angle counter. Circles have been used for generations to represent unity. For example, wedding bands are a symbol of the world's commitment to marriage.
4. Conclusion
Traffic signs are very useful information as representatives of the authorities based on text, form, and color. Traffic signs are notification boards on every road used by humans aiming to provide information and a sense of comfort for its users. Along with the development of technology and the ease of receiving information, in today's modern world, we must show how we can drive well, so we must comply with existing traffic signs. The use of yellow color on traffic signs aims to provide warning information about hazards and dangerous places in front of road users. It is characterized by yellow color as the base, and the addition of objects can be written or black colored images. Meanwhile, the red color provides information aiming to ban road users. For the use of green or blue color, it provides information to follow and tell. The meaning and shape of the signs unconsciously have a psychological meaning behind it. Certain forms make us feel comfortable with human funds in specific ways. By choosing a circle shape, it tends to send positive emotional messages about protection and safety. Then, the shape of the square gives a clear purpose.

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