

A Novel Study of Graphic Design Influence in Engineering Graphic Modelling: A Visual and Graphical Approach

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Abstract— Any specific art has a specific expressive interface and for photography, the expressive interface is light. Two main characteristics of light are its brilliance and color. Regarding the texture of subject, its color and considered contrast, each of these lights utilize. When using artificial light, the easiest way for changing its intensity is changing the distance.

Index Terms— Graphic Design, Engineering Graphic, Modelling, Photography, Light, Color, Form, Texture, Rhythm, Brilliance

1 INTRODUCTION

The most important difference of direct and indirect light is the difference of their color with original source of light.

Depth using perspective, colors using shadow and semi-shadow, and motion using beclouding and radiation of light source using luminous halos, these symbols are, similar to words during talking, individual and abstraction [1-19].

Any specific representation without considering three important qualities of color, depth and motion for subject could be accounted as a naturalistic expression [20-25].

Translator should be tried to release him/herself from constraints of word-to-word translation and inducted the soul and meaning of original script to the reader. Perspective shows depth as convergence of lines and more and more decreasing of size of things that are getting away from camera [26, 27].

In addition to ability of using a symbol as various forms, it is possible to use multiple symbols with each other and create a new foundation. For example, any specific perspective can be accompanied by specific symbols of motion and utilize various grey or dark and bright tones [28, 29].

To show the texture, ups should be bright and downs should be full of shadows [30].

Decreasing the radiation angle with surface of subject's texture leads to better illustration of subject's texture. For doing it, the most appropriate direction of light is three quarters of back. For illustrating the texture of the subject of photography, it is necessary to have a complete transparency in addition to high contrast. In this regard, Sun is the best source of light [30, 32, 34, and 35].

Many times, conditions of subject encourages photographer to take photo not subject itself [31, 32].

Graphical qualities of subject originate from its lighting and it is as important as space and condition [33, 34].

In visual arts, the term "form" is widely used to express the visual state and characteristics. Generally, form is attributed to two dimensional surface and volume and visual illustration of figures and volumes. Forms are naturally existed in our surroundings such as stone, rock, cloud, tree and animals. In addition, forms can be constructed by tools such as an sculpture which made by stone or metal. Further, the image of that sculpture is also a form [30-40].

From rhyme or state points of view, forms are either geometrical and simple such as circle, triangle and square or are a combination of these simple forms such as the forms of stones and trees. In a visual artwork, the considered topics, meanings and feelings of artist affect audiences through forms and their combinations. In this regard, lines, textures, darkness, brightness and colors also affect the audiences through forms [41-47].

In visual art, new forms could be constructed through changing in a simple form. Each of these new forms can affects the audience by a specific method. Here, a few methods for inventing new forms from simple ones are presented:

- (a) A new form could be constructed through removing or eliminating some part(s) of a simple geometrical form.
- (b) By combining and putting and repeating two or more simple form, various new forms could be created.
- (c) New forms with various visual states can be constructed by cutting and or breaking simple forms and recombining them as a new form.

Creating a successful combination is very effective both for attracting the audience and for delivering the considered visual message of artist to the audience. In fact, combination is a factor that causes the audience can effectively make a relationship with artwork through effective systemizing of arrangement and order of visual elements in a specified space and border based on the mentality of artist and visual relations. In a successful combination, constituents cannot be separated

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from the whole since the meaning of a united artwork is higher and more general than the meanings of its constituents [48–63].

In a combination, the presence of background is necessary for establishing visual correlation between elements and for providing a meaning for the forms. It is not possible to unit visual elements without a background, which can be imagining as a border or general space [64–75].

Without background, there would not any form and it has not positive and negative spaces. Therefore, border also is essential similar to the background. Combination and systemizing the visual elements are performed in relation to the form of border [76–89].

In addition to border, that the main structure is formed in relation to it, three following factors are necessary for creating a successful visual combination:

- (1) Visual balance;
- (2) Proportionality and coordination between various elements or combination;
- (3) Coordinated relationship between constituents and whole and the topic of artwork.

Among various types of combination, generally, two types of symmetrical and unsymmetrical combinations can be mentioned [90–110].

2 RESULTS AND DISCUSSION

In general, surface and cover of each thing and each form has a specific face, which called as texture. It can be perceived through touching or seeing.

In visual art, understanding various textures from toughness, abrasiveness, softness and smoothness points of view are usually performed by seeing it.

(a) Visual textures: These textures are usually constructed by simulating natural forms and things as reality. By looking to them, a feeling is waking up in us which is similar to that felt when touching them. An example is the texture of things in images which are recorded from things in photography.

(b) Graphic textures: These textures are created by various experimental methods to create pure visual effects. Graphic textures are constructed using compacting and repeating the lines in various combinations and or using dark – bright and colorful spots and or using various materials and tools. The visual effects of these textures are more fantasy than touching and visual textures.

Various visual textures can be constructed using various methods. Some of these methods are as following:

- (1) Drawing and repeating various forms, lines, spots and or special motifs;
- (2) By spraying and polishing colorful and combined materials on various surfaces and or using various brushes and spatulas and or other tools;
- (3) Using the texture of natural surfaces of various materials, which are polished by ink and color and then publishing and stamping of it on various papers;
- (4) Scratching and shaving and carving of surfaces which are polished by colorful materials or ink;
- (5) Wood, metals, glass, cloths, stone and other natural and

artificial materials provide fast natural textures and sometimes are used directly in an artwork.

Graphic textures are constructed using compacting and repeating the lines in various combinations and or using dark – bright and colorful spots and or using various materials and tools.

The surficial covers of three dimensional phenomena are perceived by tactile sensation. Tactile texture depends on internal structure of things and the process of their creation. Tactile sensation determines the difference between emery paper and glass surface through touching them. However, their difference can be visually recognized since previous experience through tactile sensation allows differentiating of textures through eyes.

Visual texture is for two dimensional surfaces and it can be identified only through eyes, although they can be recognized sometimes using tactile sensation. Painters create textures using various applications of colors on the sheet and creating lighting and applying special techniques, which are seems to be natural from visual point of view and such reality of textures is only perceived through seeing not touching. Graphic artists create various visual textures through designing and various methods of publishing on the paper, fabric, etc.

Artists of visual arts create various visual textures using various techniques. The characteristics of these textures are related to visual experiences and thinks of artists. Creation of visual arts performs by various methods.

The easiest method of creating visual textures is designing rhythmic lines in various motions and patterns. Accidental textures can be create through drawing free and fast lines and free hitting of sheet by brush.

Some of objects are of rough surfaces or other textures which can impregnate them with ink and publish them on the paper and through this method, interesting accidental visual textures can be obtained.

Cover a sheet of coated paper with black ink and or any other color. Then, scratch its surface with sharp tools. In this case, creating beautiful visual textures depends on type of performing and quality of mental plan of artist.

Shave oily pastels with various colors using a knife and collect these on a white paper. Then, place another white paper on it and place hot iron above it for a few seconds. Due to melting and mixing the oily pastels, very beautiful visual textures will be created.

In a small surface, pour some water and add to it various oil colors (can colors, special for painting doors and windows of buildings) and mixing it. Then, enter various papers to the mixture and exit them very fast. Using this method, beautiful textures and motifs create.

Wet the surface of thick drawing papers with brush and or a piece of sponge. Then, draw black ink or any other color on the paper using a brush. Colors beautifully distribute on the surface of paper and create visual textures. Success in creation of such textures depends on assiduity and exercise.

Although each of the above mentioned methods is used for a special art, it should be noted that as theater is the mother of all arts, the scene of theater is also designed using all types of

visual arts. For example, for creating visual texture in designing the scene, most of textures are artificial and visual since they are easy, timesaving, and cost-effective. A designer can illustrate the texture of copper using hair and wood glue on a piece of fiber and creating the considered textures by sharp tools (knife, fork, etc.) and copper spray. However, if he create such textures on a copper plate, it would be very time-consuming and costly and hence, more difficult. So, one of the major problems which should be considered by a designer is knowing about materials which can be used to create various textures since texture, especially visual one, make similar feelings for the audience. For example, rough textures induct brutality while soft textures induct softness in audiences. The audience will feel this feeling without having any idea about where is its origination. The audience enjoys due to satisfaction from seeing such textures but he/she has not known about its reason. In fact, designer knowing that how affects audiences using various textures.

Wood, metals, glass, cloths, stone and other natural and artificial materials provide fast natural textures and sometimes are used directly in an artwork.

Sun, which is known as the main source of light, is shining on everything and causes that we can see color, form, texture and motion of them. In fact, it is considered as the origin of our knowledge about the world and its phenomena. Light consists of particles named as (photon), which have various wavelengths and move on a wavy pattern. When light shine to something, our eyes receive their wavelengths and send them to brain through nerves. Then, the considered thing identifies by our brain from color, form, texture, motion and position points of view.

Light is one of the most important visual elements which used by visual art artists to achieve the best sensory and emotional expressions in their artworks. Light is the most important factor in creation and intensification of dimension in things and more clearly indicate the difference of surfaces in volume. By changing the source of light on volumes and three-dimensional artworks, visual characteristics will change and hence, will change the type of artistic expression. Variations of light in the nature make interesting and beautiful landscapes, which considerably affect people and stimulate their emotions. Just before sunrise, a very gentle light can be seen at the background of mountains and buildings; all elements of nature are in a gentle grey and silver color and everything is silent and stable and all volumes and three dimensional elements are calm due to lack of light and severe shadow. However, just after shining the sun, space thoroughly changes, volumes have light and sever shadows and reflect their black shadows on each other and life incredibly excite and stimulate. At the sunset, which do many people consider as the most beautiful moments of nature, it can be seen that all visual characteristics of natural elements are changed due to variation of light and

shadows and especially variation of color in sky and its reflection on all phenomena of nature, a poetry emotion with deep sadness is created in human. Radiation of light on things indicates their volume and dimension through creating various penumbras. Different color values of brightness and darkness, which named as (half-shadow), is of important role in creating dimension of objects. The contrast of penumbra increases with decrease in distance of light source and object while the number of average color values of (half-shadow) decreases and vice versa.

Texture and surficial quality of things change the characteristics of light. Objects with smooth, soft, and transparent texture such as shiny metals, glassy and crystalline surfaces and so on that the effects of light on them are stronger make various changes. Oppositely, objects with rough texture decrease the brilliance of light and minimize its reflections. By creating severe contrast between light and shadow, it is possible to make dramatic and interesting visual spaces. Warm color light provides happiness, excitement and hope while cold color light inducts depression, hopelessness and discouragement. Light is one of the main factors in sculpturing so that the main material of sculpture is selected by artist according to the quality of light and its characteristics. Painters and graphic artists also use the light as an alive and vital element in their artworks. These artists, which make their artworks in two-dimensional surfaces, show a visual of various lights by creating contrast between colors and applying different color values and creating black and white surfaces using ink.

Light is very effective on scene. For example, it is possible to create considered spaces using various lights and induct emotional effects on audiences.

3 CONCLUSION

Rhythm is repeating any kind of similar form, color, position and motion according to a determined order. According to this definition, rhythm is the base and foundation of all currents and processes of natural evolution. Humans coordinate themselves with various rhythms of nature. Rhythms of nights and days, seasons, heart rate and breathing are the rhythms of human. These continuous and repeated rhythms are in fact the origin of life perception, which are reflected in artworks.

Rhythm is one of the important visual elements that is widely used in all disciplines of visual art and is of various organizations and structures. A rhythmic motion happened when similar elements are repeated in ordered intervals. The simple rhythm makes a special visual order from the repeating of each form, color, motion and other similar visual forces due to the presence of order and reasonability in the essence of repeat. It is very effective in creating the stability between all elements of an artwork. At the other hand, the presence of opposite and different rhythms create more energy and life in an artwork and in addition to inducting order and regulation, create a kind of visual variety and easiness against dryness and coldness of uniformity. It should be noted that the pres-

ence of similar and opposite rhythms in an artwork is necessary to create feeling of united. Rhythm is a fundamental factor in the process of natural evolution and is of basic effect on all aspects of life. Generally, rhythm has three basic and fundamental aspects, both in the nature and in the art, as repeating, periodicity and growing up. Repeating is continuously presented in heart rate and breathing. Periodicity can be seen in changes of seasons, day and night, tide of sea and so on. Growing up can be seen in growing and evolution of trees and plants and or the process of creation of huge rivers which create from combination of very small streams.

Rhythm is related to order repeating the elements or constituents of a motion or action during the process. However, seeing (visual relationship) also need some time and from inspector point of view, it will be more pleasant if it is rhythmic. Rhythm is presented as following forms in visual arts:

- (a) It may be produced from similar forms in size, direction, distance and position, which is called repeated rhythm.
- (b) Similar forms with various distances can create a kind of rhythm.
- (c) Similar forms with various color, size, direction and position can make a kind of rhythm.
- (d) Rhythm can be a combination of two various rhythms.
- (e) Repeating the similar forms with gradually increasing or decreasing sizes, which create depth in surface, are rhythmic.
- (f) Repeating a form, color or specified line makes a rhythm, which can be interesting. For group activities such as parade, pulling of a massive object and so on, when people have ordered and rhythmic motion, fatigue will be postponed. People usually try to have a calming rhythm for doing repeated works. People who are felting or weaving carpet do their works with a constant rhythm. Such repeated rhythms reduce the uniformity of work but if it exceeds a determined limit, it will be boring since human organism be exhausted from repeated activities.
- (g) In visual arts, artist use from repeat along with variety to produce a calm rhythm and prohibit being boring. (Use variety in repeat).
- (h) It is accompanied by a change. This type of rhythm has a relationship with its before and after elements to induct a unique rhythm. This type of rhythm inducts feeling of motion.
- (i) This is a rhythm in which, the constituents are softly connected to each other, such as sea wave.

Smooth and soft, rough and abrasive, transparent and turbid, such as wood, glass, stone, fabric, metal, and cotton, paper etc. materials are of specific effects from visual point of view and in relation to tactile sensation. Such texture is usually seen and touched in the nature and hence, it makes some mental records for us. Human continuously experience about texture since childhood using tactile and visual sensations and his/her statements about visual quality of examples is based on his/her experiences.

It is one of the elements of visual arts which is usually believed that has a relationship with tactile sensation while its importance is more related to adventitious special forces and talents of sight. It is possible that when seeing the texture of a visual example from its surface or volume, only sight is used to perceive its concept and subject and tactile sensation will be

used along with it to understand a visual example.

There are three surfaces in cylinder volume: bottom surface, above surface and rounded side surface. It means that the concept of perspective and spatial illustration of visual elements can be perceived by putting volumes next to each other and drawing those using lines and surfaces on a plain. In addition, penumbra, which creates due to the effect of light on objects and things, is among perspective basics. It illustrates natural depth and space and further, illustrates the distance of visual elements on the surface and indicates the sizes.

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