

The philosophical and aesthetic concepts for color group system and benefiting from it in formulating contemporary sculpture installations

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Abstract:

Color occupies an important place in all aspects of our activity, and artists, naturalists, psychologists and others have been interested in different aspects of color, and other than the aesthetic aspect of colors, knowing the effect of color on the psychology and physiology of the human body has given results that we can benefit from in the field of art education in general and the field of stereoscopic formation in particular.

In this research, we emphasize that the theoretical study of colors is not intended to delete the feelings and emotions of the artist in front of the poetry of these colors, but rather to direct these feelings and refine them in sculptural works that have their own expression.

And that the radical change that occurred in the sculptural formation, until the sculptural form reached those contemporary colored sculptures, it is the biggest evidence of that revolution in the field of sculptural formation, and the employment of color appears as one of the broad phenomena of expression, where the sculptor uses color as a compositional aspect, or as an expressive aspect in the construction of sculptural work, as one of the plastic and expressive solutions for colored sculptural forms.

Through the researcher's knowledge of many of the works of modern sculpture, he noticed that many of the sculptural works relied in their construction on installation methods, which distinguished them from other artistic creations with special features that require detection and benefit from them in achieving new creative entrances that can be a vision that may contribute to finding new formulations, methods and techniques used in the field of art education, especially the field of sculpture.

The researcher believes that the sculptor can exploit the visual value of colors to create compositional sculptural formations with areas of varying colors in terms of wavelengths to achieve different visual effects. Colors are used as a dimensional value in terms of the horizontal effect of colors, which is attributed to visual theoretical effects, and that makes distant objects appear.

Colors are of great importance in linking the elements of the compositional sculptural work, whether the color is the result of the color of the material used in the sculptural work, or it was colored during its formation, and one of the benefits of color is that it can unify the work when using modern industrial materials and advanced techniques in the installation of innovative sculptural forms, i.e. structural structural sculptures.

There is no doubt that addressing the aspect of installation in the field of sculpture study, analysis and experimentation can contribute effectively to the strengthening of the sculptural formation based on the basis of scientific thinking, which prompted artists in the twentieth century to go out to new sites for unfamiliar work, and the practice of installation methods in the field of art education, especially sculpture, creates opportunities for education and training on the practices of creative thought, including the opportunities to change the shape, move it, reorganize it and arrange it in new and unfamiliar ways. In the use of these materials, it can also lead to the emergence of new plastic and imaginary patterns that reflect innovative, unprecedented and familiar plastic connotations and meanings, which is a proposed plastic entrance to the teaching of sculpture that may help to find plastic formulations that represent multiple intellectual patterns in terms of plastic and expressive.

Keywords: Systems of color groups, sculptural compositions.

Search problem:

The research problem lies in the following question:

1. What is the importance of detecting and identifying the aesthetics resulting from the different types of systems and color treatments in the compositional sculptural composition?
2. How can multiple methods and techniques of compositional sculpture be used in the development of innovative colored sculptural compositions for students of the Faculty of Specific Education?

Research hypotheses:

From the above, the researcher assumes that it is possible:

1. There is a positive relationship between the practice of compositional sculpture methods and techniques and the development and increase of the technical skills of the qualitative student teacher.
2. The possibility of employing geometric formulations in contemporary sculpture using ready-made colored materials, to reach new manifestations of compositional sculpture.
3. The possibility of presenting a contemporary vision of sculpture through the combination of the elements of the visual image and color treatments.

Research Objectives:

The research aims to:

1. Disclosure of the functional color potential and its uses in compositional sculptural formation.
2. Creating stereoscopic shapes in which the dynamics of visual vision are achieved through color.
3. Analysis of the theoretical frameworks of the concept of color, its types and uses as an aspect to enrich compositional sculpture.
4. Clarifying multiple approaches in dealing with compositional sculptural formulations.
5. Finding some entrances to develop the level of students cognitively and skillfully by taking advantage of color in building a stereoscopic sculptural shape.
6. Detection of different color systems and treatments based on the employment of colors in compositional sculpture

Importance of Research:

1. Reaching innovative plastic and aesthetic solutions by employing color in the field of sculpture in art colleges.
2. Allocating one of the units of the sculpture course for the systems of color groups and training on them before the stage of producing the sculptural composition.
3. Finding appropriate solutions to some color problems that face art education students in the sculpture course from its theoretical and practical sides
4. Disclosure of the concept of compositional formulations.
5. Identify the aesthetic, philosophical and technical foundations of compositional sculpture works.

Research Limitations:

The study is limited to:

1. Human limits: conducting research applications on the 60 students of the fourth year in the Department of Art Education
 2. Spatial boundaries: Faculty of Specific Education - Alexandria University
 3. Time limits: Academic year 2018/2019
 - Standing on the techniques of compositional sculpture and its potential in the implementation of colorful sculptural works that have new properties such as the possibility of addressing the space and the difference of contact and departure from the traditional pattern of the mass.
- The practical application depends on the use of the following manual techniques:
1. Direct material formation – assembly and installation – mold casting.

2. Conducting research applications on (Al-Masis) gypsum in two cases, the first case is colored ready, the second case, the student colors it during casting with molds.

- The research is limited to providing a training unit with many practical applications to achieve colorful three-dimensional compositional sculpture for fourth-level students in the Department of Art Education, Faculty of Specific Education, Alexandria University, which aims to produce compositional sculptural works based on the use of ready-made colored gypsum and colored gypsum by the student within templates in order to open new and diverse artistic horizons for art education students and provide the student with how to achieve color contrast in compositional sculpture.

- Study of some colorful sculptures of some sculptors, which contain an artistic composition that expresses a topic related to the impact of color on sculpture has included the study of three-dimensional stereoscopic sculptures.

Research Methodology:

In the theoretical framework, the researcher follows the descriptive analytical approach.

In the applied framework, the researcher follows the semi-experimental approach through a set of practical applications.

First: Theoretical Framework:

1. He studied the psychological effect of color and its relationship to the sculptural model.
2. Study of the perceptual properties of the colors of sculptural works
3. Display of a collection of modern-colored sculptural models.
4. Analysis of colors and their suitability for sculptural works.
5. Study the relationship of color to sculptural works and their surfaces.
6. Study the importance of color in linking and unifying the elements of composite sculptural work.
7. Study the theory of color and its basic qualities to be employed in the sculptural model.
8. Study the aesthetic values of different treatments and types of color systems and their relationship to the field of sculpture.
9. Conditions to be observed when using colors in sculptural work.
10. Study the basic stages of the visual perception process in compositional sculpture.
11. The foundations of the organization of the cognitive field in compositional sculpture.

Second: Applied Framework:

1. The practical application depends on the use of techniques (direct formation with material - assembly and installation - molding).
2. Conducting research applications on the 60 students of the fourth level in the Department of Art Education, Faculty of Specific Education, Alexandria University, for the academic year 2018/2019.
3. View results and then recommendations

The practical applied side includes a sample of fourth-level students at the Faculty of Specific Education, Department of Art Education, Alexandria University, in the light of the results reached by the researcher during the theoretical framework of the research study, which aims to clarify the philosophical and aesthetic dimensions of contemporary sculptural formations based on the compositional style in geometric formulation, so we find that the relationships resulting from the repetition of any of the elements of the composition of the sculptural composition represent a chromatic rhythm that suggests vitality and dynamism, so we note the kinetic rhythm of color in the work resulting from Repetition of colors and gradation, resulting in the sequence of lines with their movement, and the color in turn homogeneously and consists and achieves a balance between those blocks, spaces and lines, and the lines are one of the important elements in the composition and their expressive significance is multiple, The semi-experimental approach is considered one of the best and most important scientific research methods for humans, this approach is what led man to the development and construction of his civilization through observation, experimentation, access to the correct results and knowledge of sound ways to deal with phenomena and interpret them, The semi-experimental curriculum is closely related to the objectives of art education as an effective practice of detection, learning and creativity.

The experimenter in art tries to provide various plastic solutions around the one art form subject to experimentation, and this is what the applied experience of research is based on, the focus of the experiment revolves around the use of multiple compositional plastic methods, to find flexible solutions to achieve colorful compositional sculptural formations characterized by innovation, creativity and contemporary.

The importance of the experience:

- Finding multiple approaches in dealing with the compositional formulations of colored geometric sculptural formations.
- Identify the systems of color groups in sculptural work.
- Identify the characteristics of contemporary compositional sculptural formation.
- Clarifying the dimensions of the use of colored materials in light of the use of compositional formulations for contemporary sculptural formation.
- Finding multiple approaches in dealing with the compositional formulations of sculptural formations.

- **Limitations of the experience:**

The researcher applies a practical experiment to the students, in which the researcher deals with the results of the analytical study of the models of sculptural works based on the geometric compositional method resulting from the theoretical framework for research in the design and implementation of a stereoscopic sculpture work based on taking advantage of the different color relations systems implemented by the students of the fourth year at the Faculty of Specific Education, Department of Art Education, Alexandria University, and their number is 60 students to produce a synthetic sculptural work by two works for each student The first axis is an engineering formation with ready-made colored gypsum ore in an area ranging from Between 30 cm to 40 cm and the second axis is an organic geometric formation based on direct casting and coloring techniques using the colors available in ready-made molds of plastic material for easy separation of the copy of the mold in an area from 35 cm to 40 cm.

- **Timeline of the experiment:**

- The researcher designed his experiment to be applied over a month and a half in the form of a study unit consisting of six lessons, i.e. six interviews, one interview per week and a duration of four hours.
- The experience in the application of the work takes four interviews, during which the formation of sculptural material is produced with ready-made colored gypsum material A three-dimensional model in a synthetic form for the work of a complex sculpture in the form of linear geometry by two works for each student The first axis is an engineering formation with ready-made colored gypsum ore in an area ranging from 30 to 40 cm and the second work is an organic engineering formation based on direct casting techniques and coloring using the colors available in ready-made molds from plastic material for easy separation of the copy From the template in an area of 35 cm to 40 cm, this period is considered sufficient to conduct the experiment because the subject of the experiment takes more time to think about than the time of implementation.
- The experiment takes place in the first and second half months of the second semester of the academic year 2018/2019 to benefit from the accumulation of knowledge and skill experiences in achieving the results of the experiment.
- The experiment is carried out in the classroom dedicated to teaching the curriculum of the fourth year of the selected division as a sample for research, as the place is appropriately prepared in terms of the availability of lighting, tables and seats.

- **Plastic limits of experience:**

- The experiment is carried out using gypsum material (Al-Masis) and dealing with it using methods (direct formation with the material - assembly and installation - casting molds) as a methodological basis in the study of the fourth year.
- The experiment is carried out in the first axis using ready-made colored gypsum and in the second work manual coloring techniques are used, which suit the idea of the student's work and deal with it using compositional formulations according to what is required to implement the idea of creative work in terms of emphasizing the color element.

- The experiment is carried out using gypsum material (Al-Masis) and dealing with it using the methods of cutting, engraving and direct carving as a methodological basis in the study of the fourth year.
- The experiment is carried out using the various available dyes that suit the student's idea of work and deal with them using synthetic formulations according to what is required to implement the idea of creative work.

- **Unit Title: Philosophical and aesthetic concepts of color group systems and their use in the formulation of contemporary sculptural compositions**

- **Unit field:** stereoscopic formation (sculpture).

- **Philosophical foundations of unity:** philosophical and aesthetic concepts of color group systems and their impact on stereoscopic formation to create contemporary compositional sculptural works.

- **Objectives of the Unit:**

1. Providing the trainee with artistic concepts and technical skills related to contemporary compositional sculptural formation.
2. Finding multiple entrances in the formulation of sculptural works using color to achieve modernization and modernity in the work of students of the Faculty of Specific Education, Department of Art Education.
3. Clarify the philosophical and aesthetic dimensions of the compositional formulations of contemporary sculptural formation.
4. Shedding light on the artistic sources that led to the development of plastic styles of compositional sculpture.
5. Study of color treatments and the extent of their artistic and aesthetic value in the sculptural composition.

- **Unit sample:** A group of (60 students) from the fourth year students - Department of Art Education - Faculty of Specific Education - Alexandria University

- **Unit time:** 24 hours.

- **Unit Steps:** The unit is taught in 6 interviews, 4 hours per interview.

- **Materials and tools:** Sucker gypsum, water-based plastic colors, dyes, cutting tools, epoxy adhesive, hand saw, sandpaper.

- **Teaching aids:**

- Pictures and illustrations of the systems of color groups in sculpture.
- Pictures of sculptural works based on the thought and philosophy of color.

- **Setting the place:**

The place of the experiment has been prepared and equipped to be suitable for work, as three tables have been prepared that converge with each other so that they form a square minus a side, so the missing side has a blackboard and a display screen in front of it is a magic lantern.

In order to display the pictures and explain them, the tools and materials were equipped in their places on the tables so that each student can use the tools and materials he wants without hindering his colleagues.

- **Teaching methods and methods:** group teaching using the method of introduction, dialogue, presentation of practical statement and open discussion.

- **Evaluation methods:**

Unit interviews are evaluated through:

- Discussions during interviews.
- A progress calendar after each interview.
- Oral questions after each interview and at the end of the unit.
- Evaluation of three-dimensional stereoscopic works for students at the end of the unit.

Hence, the researcher has identified the procedural objectives of teaching the proposed unit as follows:

First: Cognitive Objectives:

After completing this unit, the student should have the ability to:

- Learn about the laws of color in the work of art and how to benefit from them in the compositional sculptural formation.
- It recognizes the physical properties of sucked gypsum as a technique that adds to contemporary sculpture a formal and aesthetic effect.
- Recognize the concept of color in compositional sculpture.
- He can achieve stereoscopic formulations and shapes with his material (gypsum) in the light of the thought and philosophy of color.

Second: Skill Objectives:

- Conceptualize the design based on the principles of color theory in a design that fits with contemporary compositional sculptural formation.
- The student designs a stereoscopic work through the mathematical organization of its parts.
- Distribute the proposed color plan to the design before starting implementation.
- Develops a vision and solutions to the technical and technical problems faced during the implementation process.

Third: Emotional Goals:

- Respects and appreciates manual work.
- Take into account accuracy and proficiency in the implementation of the compositional sculptural work and emphasize the dynamics of the work through color.
- He wants to continue and experiment in the sculptural work.
- The student raises new points in the explanation about the philosophy of color and its consequences on the vision of the figure.

Unit concepts:

1. Color definition:

Colors are a property and not an element in themselves as the elements do not contain the colors themselves but have the ability to reflect part of the visible light as objects absorb all the colors that we do not see and reflect only the color we see.

Colors are electromagnetic waves that have frequencies that increase or decrease according to the wavelength, and the eye has a certain ability that does not exceed it, as it does not perceive the ultra-red colors because they are too long, as well as infraviolet because they are too short

This is confirmed by (Safwat Al-Alam, 1999, p. 135) that color is a sensation and has no existence outside the nervous system, and has no reality except by linking to the eye that feels it for the presence of light, and the average individual realizes colors in nature and what he makes of things, and the individual reacts to colors so he loves one of the colors and hates another, and his emotion is reflected in the colors on the things he adds, They are released by visual artists, as well as dyeers and printing presses, and by them are the pigments they use to produce coloring. By naturalists, naturalists, by color, mean those rays resulting from the analysis of light (the solar spectrum, for example, or other spectra of different electricity bulbs). And that color in the sense of the word is that physiological effect produced by the retina, whether it is caused by colored pigment or colored light, it is therefore a sensation and has no presence outside the nervous system of living organisms. (Yahya Hamouda, 1979) The color has specific properties, namely the nacelle is the characteristic of color (red - yellow) and the value means the color light or dark, and finally the intensity and means the degree of saturation and the strength of the color.

This is the physiological effect produced by the retina, whether it is caused by the pigment of the pigment or by colored light. It is a sensation and does not exist outside the nervous system of living organisms. (Shawky, 2005, p. 99) It is an expressive element of aesthetic and plastic value through which expressive energies and visual creations can be achieved (Shalabi, 1996, p. 14)

1. Color combinations:

They are the systems of color combinations called (the artist's pallet or each artist (color pallet) any color system that is evident through the color group that he installs and satisfies for his artistic style, which are five color groups that start with limited colors and then gradually increase.

2- Color treatments:

Color treatments are the technical and performance methods followed by any artist in experimenting with color during the implementation of his design work, and the effect of color treatments comes not by paint, but by reaching the color to a form of treatment in which the advanced ability is sensually and artistically at the level of dealing with color degrees through its wavelengths and bringing it to a different level of sensory and expressive effects and that the more the designer reaches an advanced level in this field, the more able to define color in line with his experiences About the designer theme.

3- Compositional sculpture:

The researcher defines it as a process in which three-dimensional stereoscopic shapes are built using industrial prefabricated materials and natural assets with multiple installation and assembly methods and techniques in order to reach innovative solutions beyond the control of traditional solutions for sculpture using old materials. (Procedural definition of the researcher)

4- Engineering System:

"It is an integrated entity that consists of overlapping parts and elements of geometric shapes, between which simple and complex reciprocal relationships are established in order to achieve order, and is based on a geometric system, such as proportional networks or mathematical laws, such as golden ratios, or each combined with the other in designs derived from the general geometric system in nature" (Ali Al-Salma, 1984, p. 73)

5- Installation:

" **Linguistically:** Composition collection combinations (t - k - b) from the source of the rode, and stated in the definition of Jurjani, the collection of simple letters and systems to form a word

Idiomatically: It is the composition of something from its simple components and corresponding to analysis. (Zainab Kazem Saleh, Nepal Abdul Karim, 2023, p. 178)

Procedurally: an artistic trend based on the style of display within the space, with its mechanism based on its three dimensions, which can be realized from the relationships of composition, as well as the assembly of various materials and elements, the sculptor may participate within its existential effectiveness as part of the formation in the exhibition space.

7- Collection:

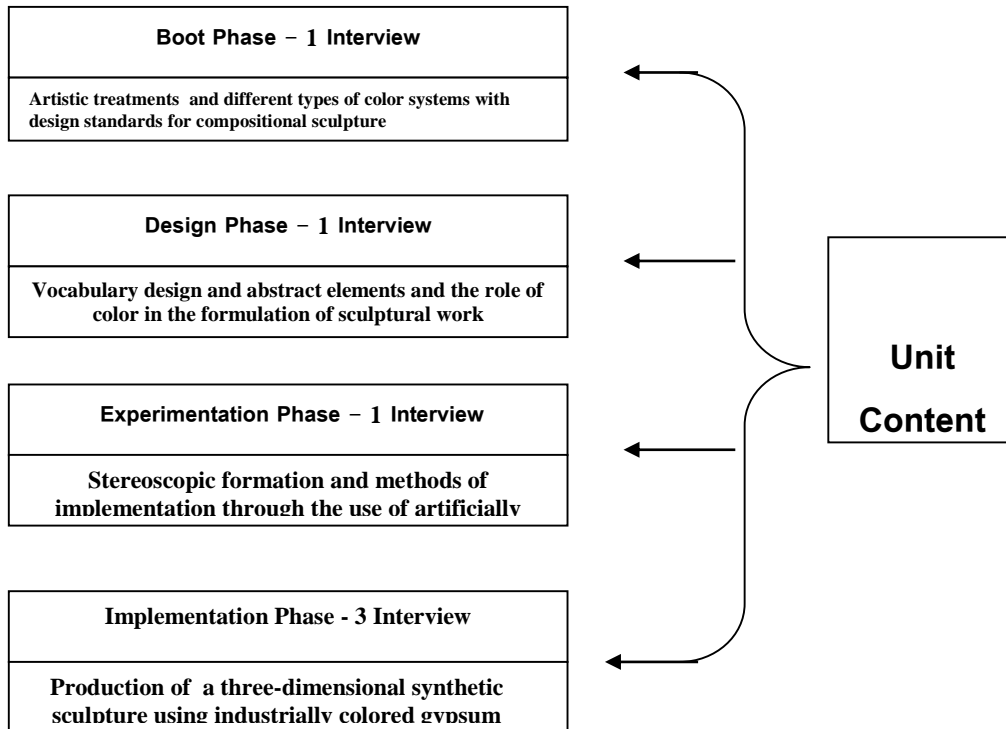
Linguistically: plural, annexation is said to collect something about a distinction that brings it together.

Idiomatically: a formula built from the one to denote the number in excess of the two" (Zainab Kazem Saleh, Nepal Abdul Karim, 2023 , p. 178)

Procedurally: It is the combination based on more than one material, technique and material that can be invested within the same work, such as metal with sculpture, cloth, stone, etc. from materials invested in the same work.

Unit Content:

It is developed through four main stages, ranging from the whole to the part and from the simple to the complex, which are as follows:



Planning No. (1)

Illustrates the course of the content of the training module – the work of the researcher

First: Boot Stage:

The first interview: artistic treatments and different types of color systems according to the design standards of compositional sculpture.

Interview Objectives:

- Introduce students to the concept of compositional sculpture.
- Reveal the importance of color dynamics for compositional sculptural work.
- Emphasizing the importance of color and balance as one of the entrances to artistic creativity in compositional sculpture.

Conduct of the interview:

Students are asked about the theory of color and the psychological effect of color in compositional sculpture and what are the psychological foundations of perception in compositional sculpture, the importance of the material in the sculptural work of a geometric nature as an auxiliary element for aesthetic vision, the perceptual properties of color and its interactive relationship with sculptural works, and is it possible to employ gypsum (Al-Masas) in sculptural works and then the trainee begins to clarify some entrances, for example:

• **Expressive color theory**

This theory is based on the fact that when the eye sees things, electromagnetic and chemical processes occur in the mind, and there is a preference for these processes in our psychological structure and the expression of color reaches the centers of sensory expression in the mind to prove and deepen, the dark blue color when linked to red and yellow lights, expresses fun and joy, and the sky filled with blue suggests activity and vitality, as well as the

sky illuminated by the light of the blue moon suggests nostalgia and return to the homeland, while the red sky portends a bad and cloudy atmosphere, while the blue sky or Green or yellow heralds a clear atmosphere. In spring, we see the richness of nature in radiant colors and saturated with light, bright colors have no borders, yellow is the color approaching white light and yellowish green has its spring intensity, while light tinged with pink, red or red in bright blue tones gives dimension and richness to the artwork. (David & Charles, p 6)

• **Color theory**

"Color theory is based on a set of concepts related to color and its design and applied uses, which are related to the concept of visual perception in man, his philosophical vision, intellectual trends and everything related to the physiological and psychological aspects. These concepts include:

A - Primary colors

When mixed it gives us all the color qualities, which are three, each of which determines a different color characteristic and gives us when mixed with all the other color qualities, and it consists of two groups

1- **Printing colors:** consisting of red, yellow and blue

2- **Light colors:** consisting of red, blue and green

B- Cold colors and warm colors:

Colors were divided in the research of impressionist painters in the second half of the nineteenth century into warm colors and cold colors, according to the impression that comes from the sense of the beholder, where blue and its derivatives of cold colors, red and its derivatives of warm colors, and black and white represent the neutral state of colors between warm and cold

C- Color harmony

Harmony can be defined as the good arrangement of the constituent elements, whether music, poetry, or color, and in the visual experience, color harmony seeks to create a beautiful scene that the eye reads through basic theories:

1 - **Dual harmony (complementary):** It consists between every two opposite colors in the circle of colors.

2 - **Harmony of identical colors (triangular):** It is a group of three colors adjacent to side in the color circle, and the lines connecting them form an equilateral triangle.

3 - **Quadruple harmony:** It is the result of a set of four opposite colors in the color circle, so that the axis of two opposite colors perpendicular to the axis of the other two colors

4 - **Hexagonal harmony:** It is similar to quadruple harmony, but consists of six colors that meet each other in a color circle and as a result form a hexagon shape based on the circumference of the circle.

5 . **Natural Harmony:** Nature provides us with many examples of harmonious color combinations, which constitute a reference for creating similar color schemes

D - Color contrast:

We can define contrast as the intensity of clarity of colors among them, and this contrast takes forms not multiple, the primary colors contrast among themselves and weaken the characteristics of contrast by moving to sub-colors of the second degree (orange, purple, green) and increases weakness by moving to sub-colors of the third degree and so on and there is a contrast between colors according to the gradation of the color value, or according to the gradation of color saturation values and there is a contrast between warm colors and cold colors and related to contrast phenomenon called the phenomenon of visual diffusion, and an example That white space on a black square area seems to the viewer larger than its real area, and on the other hand, the black space on a white ground seems smaller than its real area.

Also related to contrast is a phenomenon related to the value of color and color saturation, such as the gray area on a white floor that looks lighter than the gray area on a black floor. Gray area is also clearly inclined to the color of the floor. (Majid Diab Al-Zubair, 2019, pp. 104-105)

• **Color:**

The importance of the main influential role played by color in sculpture is evident in that it is the only element capable of giving sculptural forms a kind of sovereignty and distinction amid the surrounding environment or external space, usually necessarily having a clear color or colors that dominate the sculptural form, hindering its vision among the beholders, and robbing it of all its forces of attraction and influence.

High-level paint is a necessity that shape requires in some materials." (Sianey Geist, 1968, p. 154) The sculptor can use more than one color in painting the sculptural work to emphasize and give it an artistic character different from the surrounding space. Color has a moral and sensory force that affects the sensory perception of the human being and affects the organic and psychological state of the individual.

It is difficult to imagine a world without colors, as colors play a major role in human life and in human communication with another, because they give the quality of identification and definition to things. Everything that surrounds man has color, and colors are an integral part of the composition of different images and shapes. Colors symbolize, express, decorate, emphasize, distinguish and define because they serve as a visual language for expression and to convey concepts to every eye that sees and feels them in everyday life. (Reham Al-Jundi 2014, p. 25), color is that physiological effect, that is, the functions of the organs of the body resulting on the retina, whether it is caused by colored pigment or colored light, so it is a sensation and does not exist outside the nervous system of living organisms) Yahya Hamouda, 1979, p. 9)

As for natural science, the color has been determined by the three connotations of the wavelength, which is the radiation that composes light and has a unit of measurement called (Alangstrum) Color scientists found that the longest color wave is the red color wave and is equal to 6200 angstrom, and the second indication is the purity factor, which is the ratio between the color and the amount of white in it, and the third indication is the light factor, which is the amount of light transmitted or reflected to our eyes of this color.

Color is associated with three effects: effects of plastic value concerned with the research of angles related to aesthetics, psychological effects concerned with examining the effect of color on the human psyche, and physiological effects concerned with examining the effect of color on the human body. These effects are often recorded by the eye and have profound changes caused by the light that floods it.

The primary (primary) colors, as it is known, (red - yellow - blue) have been called primary colors because they cannot theoretically be obtained by mixing other colors, but mixing them leads to obtaining other colors.

When identifying the primary colors, we find that their meaning differs in the language of the owners of different crafts, "the primary colors in the language of the artist or painter and typographers mean red, yellow, blue and black), and the owners of the previous crafts can form a new secondary color such as the purple color from mixing the blue dye with red (Ismail Shawky, 2005, p. 104)

The primary colors in the language of the general public are (white, black, red, yellow, green and blue) and this group is called psychological primary colors.

The primary colors in the language of photographers or filmmakers and men of natural sciences are blue, green and red, which are the colors of light rays that, if mixed and added to each other in equal proportions, give rise to white rays, so they are sometimes called light colors (Ismail Shawky, 2005, p. 104).

One of the first sculptors who used color at the beginning of the twentieth century is the artist (Lippshitz) where he used one color on the surface of the work to confirm that the surface has an entity when determining what is adjacent to it has mentioned (Lipshitz) that when he came to Paris was his idea of sculpture that it is all white (Masis - marble - stone) which are commonly used materials at that time.

Lawrence said: "I wanted to get rid of the differences in light effects, by color, to prove once and for all time, the relationship of factors to each other, so the red volume remains red without interest from light, and for me (polychrome) is an internal light for sculptural works." (Albert E. Elson, 1973, p. 106)

The red color plays an important role in the visual connotations of the external appearance of the sculpture form, although it is possible that the proportions of the external form are clear and visible with the help of color Figure (3), and the critic Adolf Hildebrand says about color: "It is possible to express the proportions of the external form by colors without regard to the special meaning that colors take in nature." (Adolf Hildebrand, 1907, p. 78)



Figure (3) Yvonne Domingue April flowers, painted steel, circle diameter 2.5, 2001, Inception Paris

<https://www.flickr.com/photos/30403793@N03/14177022504>

• **Colors and their suitability for sculptural works:**

Colors can be divided into:

- 1- **Basic colors:** They are the three colors through which all colors can be obtained, which are red, yellow and blue.
- 2- **Secondary colors:** They are the three colors that result from mixing two primary colors together, which are green, orange and purple.
- 3- **Contrasting colors:** Contrast is a phenomenon that increases the difference of colors from each other when they are adjacent to each other. That is, the light color looks lighter than it really is, and the dark color looks darker than it is, and when you put a light color next to a dark color, the light color appears lighter than it is and the dark color looks darker than it is, and when two complementary colors are juxtaposed, one cold and the other warm, the cold color gets colder and the warm color gets warmer.

Color contrast is achieved through:

- **Contrast hot colors with cold colors:**

Hot colors are the colors that give a psychological sense of warmth, they are the colors of the sun, volcanoes and fire, which are dynamic colors (moving), which are yellow, orange, red and reddish, these colors are characterized by long wave frequency, which makes them give a sense of progress forward. As for the cold colors, they give a sense of calm, comfort and coldness, they are the colors of the sky, water and trees, which are green, blue and bluish-purple, these colors are characterized by short wave frequency, which makes them give a sense of retreat back Figure (4)

- **Variation in the value of color:** light colors contrast with dark colors, and the more white is added to the color, the lighter it becomes, and the more black is added to the color, the darker it becomes, and therefore the greater its contrast with the rest of the colors.

- **Variation in the degree of saturation:** where the designer can use a very saturated color in the main element of the poster or advertising sentence and a color of minus saturation in the secondary element or background, so that the main element of the poster captures the citizen's attention, draws his attention and makes him focus on the main element of the poster.

- **Contrast in the color space:** where the designer can achieve color balance through the variation of color spaces used in the poster, the use of a hot color with a small area balances with a cold color with a large area, and the hot color attracts the citizen's attention to the poster despite its small area.

- **Contrast in color texture:** Color contacts can be used to create some kind of contrast between areas in the label.

4- **Compatible or harmonious colors:** (Reham Al-Jundi, 2014, p. 49)

They are the colors that are adjacent to the circle of colors, such as red, orange and yellow, are considered harmonious colors because the orange color results from the mixing of yellow and red colors Figure (5)



Figure (4)

Hot colors and cold colors

https://www.pngkit.com/view/u2e6q8q8e6r5r5a9_dirgodaz-color-wheel-colour-wheel



Figure (5)

Compatible or harmonized colors

5. Advanced and late colors:

Colors play an important role in the sense of spatial depth (the third dimension) in the poster design, as the colors that give the viewer a sense that they are advanced are: red, orange and yellow in their degrees, and the late colors are: blue and green in their degrees. Factors affecting the progress or delay of colors include:

- **Wavelengths of colors:** which play an essential role in the sense of proximity and distance, as longer wave colors seem to be closer to the seer than shorter wave colors. Red has the longest wavelength, followed by orange, yellow, green, blue, purple, so red looks closer to the viewer than its real dimension, while green appears almost in its real place, and blue is farther away from its real place.
- **Color saturation:** Less saturated colors mixed with white appear more advanced than existing colors mixed with some gray

6. Integrated colors:

They are the secondary colors that result from the combination of any two primary colors, so the resulting color becomes complementary to the third color of the three primary color group.

1. Compatible colors:

It is any group of colors that affect the eye pleasantly and comfortably and is characterized by association and unity, despite the obvious difference between them sometimes.

2. Realistic colors:

"Realistic color combinations are imaginative and these colors may be used in combinations that differ in their factual source completely from the subject in which they are used" (Yahya Hammouda, op. cit., p. 33). Realistic colors are represented in nature, we find them in the colors of plants, flowers and animals, night and day, the blue of the sky and its clouds, mountains and their sands, and these colors move the artist's thought and be a source for creating colorful art formations in which the artist uses these colors in their different degrees in his artistic compositions, which are sometimes far from nature.

Color has interactive relationships with the elements of the artwork, and these relationships are its relationship to:

1. **Point:** A colored dot exerts more influence than a noncolored dot on the surface area.
2. **Line:** This relationship is determined in two ways, the first is that the line forms an external border of the color and the second is that the color identifies itself with an imaginary line with the adjacent color
3. **Shape:** Shape cannot be fully perceived without color
4. **Direction:** which is embodied in the direction of colors
5. **Size:** Where color contributes effectively to the sense of the presence of volume, the shape becomes more important through its color and size
6. **Texture:** It helps in the formation of different suggestions of surfaces

7. **Light value:** by which we call colors (light color and dark color)
8. **Space:** Represents the space that contains all the elements, including color

- **Psychological effect of color :**

Colors affect the soul and occur sensations resulting in vibrations, some of which suggest thoughts that comfort us and reassure us and others are troubled by them, and so colors can give you joy and fun or sadness and melancholy (Yahya Hammouda, op. cit., p. 133).

Psychological influences are divided into:

1. Direct psychological effects:

They can show something or a general composition that looks fun, sad, light, or heavy, and can make us feel cold or hot.

2 . Indirect psychological effects:

They change depending on people and come from emotional associations and objective and subjective impressions generated automatically by the effect of color.

- **Perceptual properties of the colors of sculptural works:**

There are colors that seem closer to the seer and more inferior than other colors that also appear to the eye of the seer himself and from the same distance and far away, and warm colors when placed on any surface give an effect near and are known as late or background colors (Bernard Myers, p. 241) and we can conclude from this "that colors play an important role in the sense of the spatial depth of sculptural works." We can also exploit this effect in what is called "the illusion of sight" which results in the creation of A kind of apparent zoom or reduction of stereoscopic dimensions" (Yahya Hammouda, 1979, p. 127) and we must determine the suitability of colors for the sculptural work and place them in the appropriate space for them to serve the work as a whole.

From the above, it is clear that the sculptor is able to choose the appropriate color combinations to complete the output of his artwork in the way he deems appropriate, and each color has a percentage of light reflection that must be taken into account when using more than one color in one space or in one surface for sculptural figures, because of its impact on changing the appearance of color, whether it is light, dark, glossy or matte.

- **The relationship of color to sculptural works and their surfaces:**

"By the surfaces of sculptural forms are those visual elements that are characterized by only two dimensions, while blocks usually refer to those forms that have sizes and are characterized by being three-dimensional (Abd al-Fattah Riad 1974, p. 311). The sculptor can always control the blocks and their surfaces with the sculptural forms that he creates, either by polishing or painting them, and from here the role of color appears because of its close relationship with sculptural works through its basic qualities, Figure (6)



Figure (6) Sculptural work by Paul Stein, own, 50 cm× 190 cm× 45 cm, South Africa.

<https://www.saatchiart.com/art/Sculpture-Possession/807386/11147047/view>

• **Color characteristics**

There is a set of color characteristics known to specialists identified by (Shawky, 1422 AH) in the following: -

1. **Color characteristic:** It is called the color and its instrument, which changed one color from another, such as redness and greenness, "which is that characteristic by which one color is distinguished from another, and which is called color by its name." (Yahya Hammouda, op. cit., p. 9)
2. **Purity:** Red looks like pink or solid red, and blue looks like light blue without dark blue.
3. **Color value:** the degree of color or light, such as brightness and clarity, and what is related to the color in terms of its degree of darkness or darkness, according to its proximity to the white or black color in a scale, i.e. intended to determine whether (the color is) light or dark" (Yahya Hammouda, 1979, p. 10)
4. **Extension:** The large area of green, for example, has a large range in the color circle, as it occupies an area of yellow and blue.
5. **Saturation and concentration:** When intense concentration is called saturation, and this means that no matter how much we add a color, we will not get more shine or brightness" It is the characteristic that determines the strength of color or its thickness or the degree of saturation that characterizes it, it determines how close or far the color is from the degree of purity" (Yahya Hammouda, 1979, p. 11)

Hence, it can be said that the theory calls for seeing and contemplating the environment surrounding the artist in order to have sensory perceptions that help him to express correctly during his creation.

The sculptor can expand on its results in:

- 1- The use of light and dark colors, whether by coloring or colored materials, adds to the appearance of some blocks and surfaces light and other dark because of the difference in each of them in (the value of the color that was employed in the sculptural model, as in Figure (7))
- 2- The use of different colors (intensity) in colored blocks and surfaces helps to show some of them in a saturated, pure, creamy and bright state.



Figure (7) Sculptural work by Jude Bergeron, San Francisco, paper, 2014.

<https://www.judbergeron.com/paper-plaster-bronze-2014>

Thus, it is clear to us that the use of colors in sculptural forms, which necessarily requires the use of colors that vary in their qualities in terms of quality, value and intensity, will allow the artist a wider scope for creative expression and a greater opportunity to choose one or some color solutions that suit the appearance of masses and surfaces in the closest image to his mental perceptions and emotional emotions, and at the same time increase the chance of his control and control over the elements of his artistic work.

It is color theories related to the laws of color harmonies in terms of using a single multi-degree color and employing adjacent colors. It can be concluded that the use of color harmonies, whether (by coloring or using colored materials, can lead to a state of harmony and interdependence between the masses and surfaces contained in the sculptural work, so the bonds of unity between the elements of the sculptural work increase, as shown in Figure (8)



Figure (8) Plywood sculptural work by Payne Peterson, 2018, colors in their shades were used to create harmony and cohesion between the blocks and surfaces of the work.

<https://www.artisaway.com/blog/dyed-plywood-carvings-by-bayne-peterson>

- **Advantage of color in sculpture:**

Color can be used in sculpture as follows .:

- 1. Linking the elements of sculptural work and increasing their plastic and aesthetic synergy:**

"Colors are of great importance in linking the elements of the sculptural work, whether the color is the result of the color of the material used in the sculptural work, or from the coloring of the sculptural work after its formation, and one of the benefits of color is that it can unify the work" (Seymour, Anne, 1971, p. 69) as a whole within the public sphere.

- 2. Connecting the parts of the composite sculptural work:**

Color unites the parts of a composite sculptural work when all its parts are colored in a symmetrical color or when the color inherent in the material remains constant in the work (Knobler, Nathan, 1980, p. 184).

- 3. Getting rid of the qualities of the material:**

Color took sculpture a huge step when the artist discovered the ability of color to control the phenomenological qualities of the material. One color helps to get rid of the qualities of the material, where the color becomes the texture and not the material on which the color is located (Seymour, Anne, 1971, p. 69), as in Figure (9)

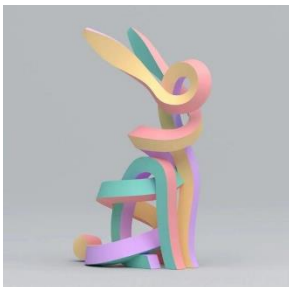


Figure (9) Lee Sangsu, Korean sculptor, wrapped colored metal strips, animal sculptures, 2023, in which color was used to get rid of the qualities of the material.

<https://p.turbosquid.com/ts-thumb/Rr/LKbNBY/oE/re2>

4- Emulating the nature of the shapes:

"Color has been used in sculpture to imitate the original color that forms take in nature, and this color use has been evident in sculptural works, throughout history" (Thompson, Jerry L., 1991, p. 90.)

Color was also used as a skin, in order to match the sculptural work to the original, which is evident in the works of the artist Georges Segal that simulates reality Figure (10)

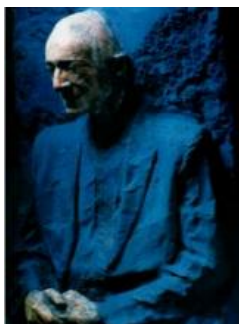


Figure (10) is a work of relief sculpture by the artist Georges Segal, in which he used colors that match the shape with nature.

5- Show and hide some parts in the sculptural blocks:

Colors are used in a new experimental camouflage style, where this visual style challenges, in many ways, the rigidity of the sculptural elements, and this camouflage was aimed at hiding and obscuring objects. This is produced by adding colored surfaces to the block, which helps in emphasizing and showing some parts of the block, as well as hiding other parts Figure (11)



Figure (11) Balloon sculpture by Jeff Koons, Lily, Broad Museum, 2016.
https://farm2.staticflickr.com/1559/24469946600_981a2fd4a8.jpg

6- Confirm the idea of the business:

Color is used within the framework of the assertion of the expressive power of sculptural formation through the effect of color on both mass and volume and sculptural space. Color can be used as an extension of the expressive power of shape, size and concept of sculptural space relative to the earth's surface, where it can be relied upon as a vital point of renewal, Figure (12)



Figure (12) A sculptural work by David Smith, Steel, referring to birds, in which color was used as an extension of the expressive power of shape, size and sculptural space.

https://www.bing.com/images/search?view=detailV2&insightstoken=bcid_qDST-mxPrGOHVA*ccid_NJP

1- Confirm and show the dimensional value:

The sculptor can exploit the visual value of colors to create sculptural formations, with areas of varying colors in terms of wavelengths to achieve different visual effects. Colors are used as a dimensional value in terms of the horizontal effect of colors, which is attributed to the visual theoretical effects used in photography, and this makes dimensional objects appear close" (Seymour, Anne, Op. Cit, p. 69)

Planning for the use of color in the sculptural work is taken into account starting from the first design process of the sculptural project, where:

- "The use of color harmonies leads to a state of coherence between blocks and surfaces and highlights the unity of design in the sculptural work.
- Contrast and contrast colors separate adjacent sculptural masses and their surfaces due to color contrasts that reinforce the contradictions of form and mass.

1. The use of color in sculptural work gives blocks and surfaces imaginary dimensions As a result of the difference in visual vision and the color used in general, the use of colors in sculpture helps to give an atmosphere of optimism and positivity to the viewer, making them more satisfied with the experience.

• **The importance of colors in stereoscopic formation sculptures:**

Colors are one of the basic elements in sculptural art, and play an important role in highlighting the artistic aesthetic of both prominent and recessed sculptures, as colors express different feelings and ideas, and help direct attention and highlight the artistic importance of the sculpture. By using colors correctly in relief sculptures, a range of artistic objectives can be achieved, such as highlighting the aesthetic details of the sculpture, highlighting certain aspects of the artwork, and highlighting the artistic significance of the sculpture in general. "(Maysa Ahmed Ali Al-Far, 2024, p. 642)

• **Types of different color schemes:**

Color perception is an essential element of vision and plays an important role in visual memory-based discrimination.

The perceived color is affected by three aspects, one of which is the nature of the surface on which the light falls, the second is the properties of colors, the third is the amount of lighting and the angle of projection, and color

systems are affected by several aspects, one of which is the color or its characteristic, which indicates the quality of the color that you determine, and the second is the value of the color and means the extent of the luminance of the color or its darkness in relation to the original color and the extent of the difference in degrees and color shades, and the third is saturation, which means the degree of purity of the color or its mixing with other colors, as well as the relative degree of purity of color, which is brilliance, purity and strength Color (Nermin Hussein Saleh, 2012)

- **The relationship of treatments and different types of color systems to design standards in sculptural formation:**

Color systems are a logical systematic way to arrange all primary colors and secondary color groups, and there are many ways to arrange colors, such as taking descriptive names or placed in a numbering system or both., Therefore, color systems adhere to the following facts: A continuous system of color arrangement - a system of logical significance - Dimensions and conceptual connotations - Fixed, accurate and specific samples. (Fairchild MD,2006, p.p 312)

Color selectors or color markers are physical forms suitable for any system, color schemes are three-dimensional.

The color treatments for the design can be determined by following these steps:

- 1- Identify color combinations expressing the theme of the design.
- 2- Identify color rhythms that achieve aesthetic values in design
- 3- Distribution of color treatments related to the subject of each element in the design in terms of the color qualities that characterize each element separately.
- 4- Modifying the color treatments of the shapes and elements selected in the design in terms of their compatibility with the nature of these shapes and their relationship to the subject of the design.
- 5- Emphasizing the movement in the design through the distance extension arising from the difference in wavelengths and the multiplicity of color values associated with the subject. (Linda Holtzschue, 2011)

- **Synthetic and collective art in contemporary sculpture:**

The concept of synthetic and assembling art has moved to contemporary sculpture, as it achieves its presence in one boudaqa by invoking sculptural techniques and other media to modify the way we perceive and understand space, as the sculptor may integrate any media to create his artistic experience, calling natural materials - video - photographs in his plastic work, as a pragmatic philosophical mechanism and a deconstructive pressure at the same time, referring the achievement to pluralistic reading (Albayati, 2010, p 197) The formation is based in its structure on the intuitive dimension that includes all intellectual processes without having a goal, and it is thus liberated from the skill of the artist, that is, the idea becomes the real goal in the arts of postmodernism instead of the work itself, it is a current that exaggerates its rejection of beauty as the artist is a painter, sculptor and potter, that postmodernism adopts an intellectual vision towards a certain thing to aspire to be a work of art. |as mentioned (Robert Atkins)The art of assembly is an extension of the art of collage and its development, but in stereoscopic forms, through the use of three-dimensional models or materials in artworks (Atkins Robert, 1995, p50), where artists took advantage of all the materials available within their environment, to achieve their artistic formation, where the materials were ready to be made in advance.

- **Sculpture assembly:**

The concept of assembly depends on many structural and intellectual data, because of this concept of a clear presence in the art of contemporary sculpture, it is the re-formation of artistic products through the use of a set of real things and its technique depends on the assembly of some ready-made pieces of consumer society and their new installation to create new plastic relations, a trend that is based on combining different material elements specially equipped for prefabricated work or from old waste or industrial waste and defines assembly as re- To formulate innovative artistic visions during experimentation with different materials, which occurs an interaction between the multiplicity of materials and their differences, and the spread of vocabulary or the use of deletion and addition, taking the relationship of overlap between vocabulary and different materials an aesthetic character and the method of assembly depends on the overlap of different materials by pasting and synthesis, and it is created by placing different materials and installing them on the surface of the painting in different ways to develop plastic

dimensions, although its origins at the beginning of the twentieth century, but it was called this name as a trend in 1950, which is a global trend Especially in United States, it is also the three-dimensional consideration of collage and assembly art" includes the transformation of non-artistic objects and materials and their installation to make a kind of sculpture resulting from assembling them together or building them using glue or even by welding. This type of performance of the method of work of sculpture made his idea different from the traditional works of stone carving or reproduction of molds and casting methods, which in turn turn into bronze casting, the artist's use of non-artistic elements or even ballet from the real world, and collective sculpture is the art of processing the artistic details of ballet objects spontaneously with a veil of conscious thinking and allowing room for denial and unconscious feelings repressed to express themselves (Howayda Sibai, 2008, p. 12)

The researcher believes that the collective sculpture expresses a state of multiplicity in the use of industrial and natural materials through the assembly of elements in the surface space of the artwork, synthesizing them and showing harmony between them.

The collective artwork is a state of permanent experimentation and the search for new materials to choose materials and integrate a variety of materials in sizes, shapes and textures together in different ways that express the awareness of the artist, as the collection sculpture exploits the materials and materials provided by the environment to help the artist develop his skills, techniques and culture to exploit them in the service of his idea and vision.

- **Psychological foundations of perception in compositional sculpture:**

A - General preparation: It is determined by the extent of excitement that reflects the response of the artist and the viewer to a new cognitive situation.

B - Previous experience: When the artist is exposed to seeing new things and elements, he tries to explain these things by comparing them with what is known to him in his visual inventory in order to gain them a familiar meaning to him.

C - Attention: It means directing the feeling towards the visuals in general in a desire to know the external subject and its interpretation" (Ahmed Mohamed Abdul Khaleq, 1991, p. 19.)

The researcher concludes through the previous interpretations of the realization that the process of visual perception of the compositions, which will be addressed experimentally using elements of ready-made materials in this research goes through three basic stages:

- **The basic stages of the visual perception process in compositional sculpture:**

A- The overall view of the perceived structural work, as the perception of the forms as a whole precedes their perception as parts.

B- Analysis of the elements of the compositional work to realize the relationships between its parts, as the element individually differs from the element in common with other elements in the sculptural installations, and since each element of the installation has a specific function depends on the overall data in this whole, the element in each differs from one installation work to another compositional work.

1. Combining these elements to see them as a whole again, and the Gestalt reached a set of foundations and principles that control the process of visual perception, which are the foundations of the organization of the cognitive field and related to the perceived thing and the surrounding environment in the field of visual vision and identified in:

- **Foundations of the organization of the cognitive field in compositional sculpture:**

a- Principle of organization :

Visual perception is a total perception of complete formulas, and the mind does not perceive molecules and depends on some laws of organization such as convergence and similarity.

b- The principle of education :

It is based on previous experience through the memory of the subject's shape, color, proportion, proportion, and size of objects known to the viewer.

c- Product Thinking:

The perception or idea that is inspired by the mental functions of the subjects, where the viewer's mind tends to the associated elements that contain a kind of organization, and does not tend to discordant elements.

d- Similar:

It means the method or model of vision and mental representation common in culture, as perception does not depend on the visual system, but the brain plays an active role in the process of perception, and mental perception affects vision and the process of vision, and what the viewer perceives visually is what the mind allows to perceive only with the fact that not everything that falls on our sight we perceive" (Arnheim, R, 1933, p. 323)

• **Aesthetic elements of geometric shapes:**

1- Surface:

It is geometrically means length and width, but they cannot be expressed in a vacuum without considering the thickness, and the difference between the surface and the hologram is relative, and if both length and width overwhelm the thickness, we realize the shape of the flat" (Robert Gillam Scott, 1980, p. 144)

The surface has multiple forms, including flat - rectangular - or circular or free body, which is not related to the geometric shape, which does not affect the effectiveness of the space unless the surface is twisted or arched in the neutral plane and arched and convex or concave has its impact on the mass Valmahmood expression is a positive spatial size and vice versa in the concave shape and perception linked to the quality of the artist's style and techniques.

It is the texture of the material used in sculptural works, and the texture can be controlled, as it is an important part in the sculptural formation in projecting light and shadows and adding the dramatic effect on the viewer occurs from vibrations and light reflections resulting from the contrast of the work surface and what is meant by the texture, the surface of the artwork and the resulting use of various contacts (soft contact - rough contact - regular contact - irregular contact) and the way it is processed.

Constructivist artists used surfaces in their geometric works in a different way than artists of other artistic movements, "as the texture in contemporary sculptural artwork is not only related to its material importance in form, but is also a means of expressing content that adds moral values to the artwork" (Saeed Al-Watiri, Salwa Al-Gharib, 1988, p. 69).

1. Structure :

They are forms that exist in a tight system of elements of different modes, which are single-type elements and can be identified from their composition, and also identify the form of the basic system that governs those elements, as we can understand its mathematical or geometric law.

For all visual observation processes require special divisions, these divisions appear and appear in individual cases as principles of organization and through those divisions appear forms observed in the form of space or three-dimensional composition in their relationship to each other, and in their construction and in their specific lines. It seems through the differences between them and the identification and clarification of the elements from point to complete design is the basic principle of this division. Accordingly, division concerns the psychological characteristics and external appearance of the visual form.

Second: Design Stage:

Second interview: Vocabulary design, abstract elements and the role of color in the formulation of sculptural work:

Objectives of the interviews:

- Introduce students to engineering units and how to formulate compositional them.
- Focusing on the importance of the laws of proportionality, superposition, equilibrium and correspondence in the distribution of units within the work.
- Emphasizing the diversity in the choice of colors and the multiplicity of color tones for one color.

Conduct of interviews:

- The importance of recognizing the existing relationships between shapes in the distribution of abstract units on design bases and the extent to which they can be organized within various compositions and formations characterized by balance and harmony, which depend on repetition, superposition, seam, balance and exchange between shapes and floor.
- A visualization of the distribution of colors and colorization of the design is made in gradual tones that achieve shadow and light.
- Find solutions to the problems facing students while drawing the design.

Interview Procedures:

- A group of fourth-year students studying the curriculum of color theories in art and design were selected.
- Various topics have been selected for the visual images that contain all the elements that enrich the color treatments in terms of their various effects
- Each student has done a set of analytical color studies according to the steps referred to before in order to identify the color effect required for the design subject of the sculptural work.
- Each student in the project started by making a design for the application of the analytical study that he had previously done to determine the color treatments chosen for his sculptural installation.

- Each student expressed the designed subject through different color techniques such as gouache colors, watercolors, forcing and wooden color pens within the framework of what suits the desired color treatment of the design subject.

Take the following steps:

- Choosing the color scheme associated with the theme of his sculptural design.
- The chosen color scheme is adapted to the elements and foundations of the structural compositional formation and the design theme of the sculptural work and the extent of its impact on the recipient.
- Experimenting with a number of color treatments and their impact on translating plastic values and achieving aesthetic values for sculptural work.

Evolution of design stages:

The period of its completion from the beginning to its completion in a final form in four stages, namely:

- The stage of the initial idea of the design and tracking the idea of the research and its objectives.
- The initial planning stage of the design includes the identification of different color systems and technical methods in addition to the new color treatments
- Pre-final design stage, including the stage of technical experiments in the preparation of designs
- The final design stage These are the structural stages of the design, as each stage depends on the stage that precedes it, and it is not possible to start in a stage before the completion and completion of the previous stage.

• **Conditions to be observed when using colors in sculptural work:**

The successful use of color requires the following to be taken into account:

1. Achieving unity and harmony.
2. Color matching to the target.
3. Diversification and suspense.
4. Arrangement and gradation in colors if numerous.
5. Balance colors when combined together in one space so that one does not overshadow the other.

From the above, it is clear the importance and impact of color on sculptural works and the extent to which color can be used and applied to sculptural works, as well as there is an influential and effective role for the material in the success of the sculptural work, which is what the researcher is exposed to in the study.

Third: Experimentation Phase:

Third interview: stereoscopic formation and methods of implementation through the use of artificially colored and also hand-colored material:

Interview Objectives:

- Identify the characteristics of gypsum raw material used in the forming process.
- Enumerates the forming methods and tools used.
- He experiments with some plastic techniques before starting the actual implementation of the sculptural work to discover the best performance and employ it in the sculptural model.

Conduct of the interview:

- By learning about the methods of formation and how to assemble, install and build to the appropriate shape.
- Practice how to overlay the units and the good and consistent installation of the desired design.

Interview Procedure:

• **Gypsum ore:**

"Gypsum is a type of sedimentary rock and has been discovered by man thousands of years ago and the Greeks are the first to give the name of gypsum to this material, and gypsum can be called the name of plaster and is chemically composed of: calcium sulfate containing water, where it can be defined as the product of partial separation of water from gypsum limestone and converted into a form of disjointed molecules (powder).

- Composition and environment of gypsum sediments:

"Microscopic petrographic studies of sediments have proven that gypsum may be in a basin at the Miocene period and this basin has formed after the subsidence of a land mass between two parallel regional splits with a north-south ratchet, and the continued formation of gypsum and anhydrite proves that the structures that control sedimentation here with regional structures and relative to the theory of movement and collision of continental plates that formed the Red Sea, which can be summarized in the composition of gypsum sediments as follows:

- The formation of a deep swamp in a north-south direction separated from the sea by a barrier of coral reefs or by a narrow winding channel.
- The spread of hot dry climate over the region.
- Water in the swamp is continuous due to the presence of permeable layers or window barriers with a water channel, in which salt sediments increase with a slow subsidence of the swamp.
- Sedimentary interventions between gypsum clay rocks, clay rocks and clay stabilize swamp sedimentation cycles.
- The presence of gypsum and limestone with the coral reefs , which form the upper part of the sediments in the eastern part, proved a sedimentary environment associated with the tides of the Red Sea on the swamp and the presence of coral reefs represent the remains of the barrier coral that separates the swamp from the sea. (Amal Saleh Ahmed Zein et al., 2002, pp. 32-33.)

- Locations of gypsum:

The plaster does not exist pure full purity when extracted, but contains varying proportions of calcium carbonate and quartz sand with amounts of other materials, and places of gypsum extraction in multiple Egypt is extracted from the mountains between Aswan in the south and the city of Esna, while the places of extraction in Lower Egypt in western Alexandria and in the area between Ismailia and Suez as it is found in Fayoum and also in the area that extends between Cairo and Beni Suef in the south.

- Use of gypsum:

- Making perishable and sustainable molds for art collectibles.
- Manufacture of statues of flat and three-dimensional sculpture.
- Decoration, decorations, work of architectural cornices and models.

- Structural gypsum durability:

The durability of gypsum for pressure ranges from 50%: 200 kg / cm² and this resistance depends on the following:

1. Gypsum additives to reduce the speed of its doubt.
2. Rough calcination temperature.

3. The amount of water needed to make a plastic paste of gypsum, so the gypsum resistance to pressure increases the less the amount of water. (Farouk Sharaf, 2002, p. 61).

- **Gypsum dryness:**

"Gypsum gets half its strength after 24 hours of putting it in place and the whiteness of gypsum, which contains gypsum + sand in a ratio of 1: 2, its strength is 60% of the whiteness of gypsum, which does not contain sand, and the additives to the gypsum to control the time of doubt reduce the resistance of gypsum after hardening, the tensile strength of gypsum is weak, and the graphical curve of stress in tension and pressure is almost a straight line.

- **General properties of gypsum:**

1. Its color is white and there is a grayish-white or pink one.
2. Accepts coloring and color saturation.
3. It is characterized by being brittle and scratching with the nail.
4. Poorly soluble in water.
5. It is characterized by the possibility of kneading with water and then hardening it in a short time, taking the form of the body on which it is located, and therefore the possibility of using it in casting molds.
6. The amount of water needed to make a gypsum kneading can be estimated by about the amount of gypsum to two and a half amounts of water and the gypsum worker must rely on experimentation to know the necessary proportions according to the conditions of each packaging.
7. Gypsum is a malleable material where the sculptor can make his statues, whether by direct sculpture or by completion." (Nazir al-Zayat, 2000, p. 35)

Fourth: Implementation Phase:

- From the fourth interview to the sixth interview:** 1- Production of a three-dimensional structural sculpture using artificially colored gypsum.
- 2- Producing a three-dimensional sculptural sculpture using hand-colored gypsum.

Objectives of the interviews:

- Appreciate the value of the output of sculptural work to the fullest and extreme accuracy.
- Feel the importance of color in compositional sculptural work.
- He takes care of contemporary sculptural work and feels continuous and experimented with.

Conduct of interviews:

- Students begin to implement the first axis by assembling and installing the elements of the sculptural work, the second axis is the use of direct manual coloring techniques during casting.
- The lecturer guides the students who need and explains the part related to it.
- The lecturer shares with his students in watching what has been achieved and exchanging experiences and views on the best arrangement of units to obtain the best compositional sculptural composition.
- The works are discussed at the end of the last lecture and the sculptural works are prepared and directed for the exhibition.

Interview Procedures:

From here, the researcher began to present and present to the sample of the experiment that the initial geometric abstract shapes, which is based on the approach of the fourth year to study, analyze and use them in the work of stereoscopic configurations, can be used in the same ways as plastic treatments in the work of colorful compositional formations, then the researcher asked the experiment sample to do two works for each student with specific geometric bodies for the subject of the experiment with a focus on three-dimensional stereoscopic works, and the researcher relied on their experiences in the study of sculpture in the third year in the sculpture curriculum of the College of Education Quality.

The students began the practical procedure of the experiment after the presentation and explanation provided by the researcher, but it remained an open dialogue throughout the period and time of the experiment between the students and the researcher through which they address some obstacles such as the problems they face in the practical and executive procedure processes.

This research tends to study some contemporary sculpture works with the aim of extracting new plastic solutions and various aesthetic dimensions through the study of color groups, and the possibility of benefiting from them to enrich the works of compositional sculpture.

The curriculum decided on the fourth year chosen by the researcher sample experiment includes the study of a set of abstract shapes that are posed to students during their practices during the study, and these forms of preliminary models of geometric shapes, the researcher chose to implement the subject of the experiment including a set of forms that students have already identified and specifications, and this was behind the identification of the second semester as an appropriate time to perform the experiment to take advantage of the accumulation of cognitive and skill experiences in dealing with the initial forms as thought And plastic treatment, and the researcher intended to choose the geometric shape as one of the elements of the sculptural installation to create a kind of determinants, which calls for thinking to find multiple plastic solutions, and the researcher intended to use the same material (gypsum) used in the study of the curriculum of the fourth year, to be a continuation of their previous experiences in the formation and as a fixed asset in teaching the curriculum, so as not to enter the material as a second challenge that results in an impact in measuring the experience and in order for the student to focus the idea of switching from three-dimensional shapes to a contemporary compositional sculptural body.

Unit Calendar:

- Discusses the educational dimensions of the use of gypsum material:

Modern science and technological progress have contributed clearly and effectively to the emergence of machines and tools, which led to easy access to them in a manner commensurate with the student's potential, in terms of saving time and effort, and gypsum is also considered one of the most important raw materials because of its availability and the spread of its sources in the local environment and because of its technical properties and ease of formation and that gypsum material is exciting that moves the student's imagination for artistic expression and also knowledge of the physical and structural properties of gypsum material has a role in facilitating the experimentation process And the development of innovation, without experimentation is impossible creative process to emerge and without experimentation organized impossible the emergence of generations developed and innovative, through experimentation can build a positive personality persevering and effective, and able to interact positively with the data of the times, which in turn will contribute to modifying the behavior of art students, to prepare it so that he can be able to adopt ideas that contribute to the dimensions of free innovation, which in turn works to develop and form the necessary skills, to deal with gypsum material And methods of coloring, which is the subject of research.

Through this, it is possible to consider some educational dimensions to benefit from the study of the physical properties of gypsum material in teaching sculpture:

1. Utilizing it as a raw material available in the environment.
2. Preparing a generation of art students who can deal with the sucked gypsum material with a modern technical concept.
3. It opens new horizons for experimentation that helps develop the innovative thinking of the student.

First - Benefit from it as a raw material available in the environment:

The economic dimensions of gypsum material come and be commensurate with the student's economics, especially the local types of gypsum available in all environments in abundance, and so far it has not been possible to benefit from them very little, and that these properties of the raw material of gypsum sucked give an opportunity to the practitioner of art to give responses through experimentation as stimuli that open wider horizons for the use of wood material in his sculptural work.

And that the main purpose of educational thought is to adopt and develop the thought of students from an experimental point of view in order to build a positive personality capable of challenging the times and interacting with its data.

The researcher believes that taking advantage of the gypsum material available in the Egyptian environment in available quantities and at reasonable prices for students of sculpture, can be used in the sculpture process, and the student can through it perform some operations related to the process of sculpture with gypsum material from cutting, cutting, deletion and connection as plastic possibilities for sculpture work, which need to set prior preparatory fees for his sculptural work and taking advantage of the physical, structural and sensory properties of gypsum material and what the sculpture process will contribute to enrich the plastic and expressive aspect in his compositional sculptural work Colored.

Second - Preparing a generation of art students who can deal with the raw material of gypsum sucked in a technical synthetic concept:

The student of sculpture in the Faculty of Specific Education needs a variety of experiences in the use of different materials or formation with different materials and depends on the teaching of the art of stereoscopic formation at the Faculty of Specific Education on the formation of materials and material media multiple plastic and expressive capabilities in order to provide students with information and plastic experiences contribute to their artistic expertise to achieve stereoscopic works with new ideas and expressive contents and that the benefit from the study of the physical properties of gypsum material as a technique helps the art student to develop solutions and plastic formulations for his compositional sculptures where the study of The physical properties of gypsum material available in the Egyptian environment, whether local or imported, and the tools and automatic electrical and manual equipment used in the process of structural sculpture, which affects the methods of forming gypsum material in sculptural works.

The researcher believes that the art student should take advantage of the physical properties of gypsum material (density, flexibility and resistance) in order to know the truth of the material he deals with, through this knowledge can be formulated in his sculptural work and through his prior knowledge of the properties of the material and how he can benefit from it in the plastic side by finding solutions and formulations suitable for the surface he deals with, which confirms the expressive content of his sculptural work.

Third - opens new horizons for experimentation that helps to develop the innovative thinking of the student:

The researcher believes that experimentation is not a matter of appearance, but it is the objective means to reveal and establish scientific behavior, which is thus an urgent need to know the facts, reveal and choose them, and through it can be proficient in achieving the special goals of the material and revealing its truth and what can be provided to the art student to benefit from it in enriching the plastic and expressive aspect of his sculptural works.

The researcher believes that the main purpose of educational thought is to adopt, develop, educate and educate students in order to build a positive, persistent and effective personality, capable of positive interaction, which will contribute to modifying the behavior of the student in particular and society in general.

- It is clear to the researcher that the balance of information in the individual plays an important role in his innovative thinking, and this is a prerequisite and necessary, but it may be insufficient, without innovation, the creative process is impossible to emerge and without training and experimentation organized through the educational process, it is impossible for the emergence of advanced generations of contemporary innovators and art students stand without identity.
- The sculptural works are presented after preparing them for the exhibition, and the lecturer manages the discussion with his students about the extent of benefit from the application of color theories in the light of the concept of abstract compositional art in sculpture, the tactile effects of the material used, and the most important methods of cohesion and fixation, with an emphasis on the pros and cons of formation for each sculptural work and pictures from 13: 100 The research experiment is presented to the students of the fourth year, Department of Art Education, Faculty of Specific Education, Alexandria University, for the academic year 2018/2019.

Research Experience

**For students of the fourth level, Department of Art Education, Faculty of Specific
Education - Alexandria University**

**Models of the first axis implemented using industrially colored ready-made material -
Figures (13-52)**



Figure (13)



Figure (14)



Figure (15)



Figure (16)



Figure (17)



Figure (18)



Figure (19)



Figure (20)



Figure (21)



Figure (22)



Figure (23)



Figure (24)



Figure (25)



Figure (26)



Figure (27)



Figure (28)



Figure (29)



Figure (30)



Figure (31)



Figure (32)



Figure (33)



Figure (34)



Figure (35)



Figure (36)



Figure (37)



Figure (38)



Figure (39)



Figure (40)



Figure (41)



Figure (42)



Figure (43)



Figure (44)



Figure (45)



Figure (46)



Figure (47)



Figure (4)



Figure (49)



Figure (50)



Figure (51)



Figure (52)

Models of the second axis implemented using the colored material manually by casting in molds - Figures (53-100)



Figure (53)



Figure (54)



Figure (55)



Figure (56)



Figure (57)



Figure (58)



Figure (59)



Figure (60)



Figure (61)



Figure (62)



Figure (63)



Figure (64)



Figure (65)



Figure (66)



Figure (67)



Figure (68)



Figure (69)



Figure (70)



Figure (71)



Figure (72)



Figure (73)



Figure (74)



Figure (75)



Figure (76)



Figure (77)



Figure (78)



Figure (79)



Figure (80)



Figure (81)



Figure (82)



Figure (83)



Figure (84)



Figure (85)



Figure (86)



Figure (87)



Figure (88)



Figure (89)



Figure (90)



Figure (91)



Figure (92)



Figure (93)



Figure (94)



Figure (95)



Figure (96)



Figure (97)



Figure (98)



Figure (99)



Figure (100)

- **Results:**

The researcher was able to reach several results in light of achieving the objectives of the research and its assumptions, the most important of which were the following:

1. The use of colors by some artists to give aesthetic value to the sculptural work.
2. The color system is compatible with the elements and foundations of structural formation and the subject of the design and the extent of its impact on the recipient
3. The extent to which color treatments affect the translation of the expressive values of the subject and the translation of aesthetic values in sculpture
4. The distance span arising from the difference in wavelengths and the multiplicity of color values associated with the subject emphasizes the movement in sculpture.

- **Research recommendations:**

Through the results of the research and the findings of the researcher of the results of the analytical and semi-experimental approach, the researcher recommends the following:

1. Conducting studies on the effect of color on the perception of the interactive stereoscopic shape and the possibility of adding a new aesthetic value through color.
2. Attention should be paid to understanding the methods of employing color in sculpture.
3. We should be fully aware of the nature of the plastic solutions achieved in sculptures colored in red and other colors.
4. Deepening the perception of concepts related to color and visual perception should be deepened.
5. Educational institutions should study colorful sculptural works, ancient and modern.
6. The necessity of beautifying the facilities from the inside and outside with colorful sculptural works.

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