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The Dynamics of Actual Movement and its Aesthetic Applications in The Field of Interactive Sculptural Formation

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Abstract:

The movement in sculpture has become a new start for the work of art and its concept varies from one art to another, as the artwork represents a system of interrelated relationships in which each element works to attract the other, and the elements collide and fuse in a harmonious way and appear in a common or non-common state towards a visual structure represented by the form proposed to us by the elements of the composition of the form as a whole.

The concept of sculpture has changed radically over time to keep pace with the rapid developments in the era of modern multimedia technology, multimedia is a merger between the computer and the teaching or artistic means to produce an interactive hyper-environment that contains audio, image and video software linked to each other in a hypergenerated manner through the graphics used in the programs, the most important features and qualities added by media technology to the arts is the "interactive character" that was affected by several areas of life, including the field The first appearance of animated art with the idea of interaction was in the works of Marcel Duchamp, the famous French painter in 1920, when he engaged the audience in the creation and use of the resulting interaction as an element of building the artwork through the use of what is ready-made in a conceptual context.

This was a prelude to the emergence of interactive sculpture, which led to breaking the barrier of time and space, by breaking the idea of semi-established artistic templates centuries ago, and brought about an openness to angles where the antonyms and similarities, vision, understanding, interpretation and perception overlapped, and thus the art of interactive sculpture is one of the contemporary arts, through which sculptors realized that there is no stability in this world, so stability is no longer necessary or has priority, so the subject was related to a modern vision of sculpture and its designs, which invited the designer to think about not being bound by the traditions of consistency The huge size, stability and silence, and it is heading in the worlds of technology and media, where the natural and the industrial, fixed and mobile, architectural and non-architectural overlap.

The research is interested in studying the significance of movement in interactive sculpture, the movement is one of the expressive means shown by the artist through forms, spaces and blocks suggest its shape and conditions of movement, and that the kinetic installation in the construction of forms is one of the vocabulary of artistic composition and important vocabulary in plastic art and sculpture in particular, as well as sculptural works have a dimension and structural installation kinetic acquires its identity and continuity more than the inhabitant.

Keywords:
Dynamic, Movement, Interactive Sculpture

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Search problem:

There are many sculpture artists whose concepts were associated with kinetic art and they employed plastic media in terms of expressing their sculptural concepts, and their plastic formulations reflected many variables associated with plastic and expressive values, which led to addressing this topic to stand at this type of art and the structural structure of the elements of moving sculptures.

The research aims at the importance of spreading artistic awareness and aesthetic taste of interactive sculptural works among the groups of society, interactive sculptural works urge the viewer to interact with them and know the goal of them, the main task of the artist is to deliver his message to the viewer and connoisseur in the best appropriate ways, the research dealt with how to benefit from the element of movement in the production of interactive sculptural works and the research also dealt with the stages that the connoisseur of the sculptural work goes through.

The most important results were that the sculptor should pay more attention to the interactive sculptural works that both the designer and the viewer participate in their production and the use of nature and the environment as an inspiring element for the artworks, so that they reach the viewer in a smooth way that is easy to taste, thus enriching the artwork and spreading artistic and aesthetic awareness among the segments of society.

The research problem lies in the following question:

- How can the movement be used and its relationship to the perception of contemporary interactive sculptural form?

Research hypotheses:

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

1. The visual dynamics of the stereoscopic shape can be achieved through the use of interactive motion in its construction.
2. There is a positive relationship between the use of the element of movement in the construction of the stereoscopic shape and the interaction of its parts with each other and its interaction with the recipient.

Research Objectives:

The research aims to:

1. Reaching stereoscopic shapes in which the dynamics of visual vision are achieved through the element of movement.
2. Illuminate the importance of the relationship between the recipient and the interactive sculptural work.
3. Benefit from the connection of the stereoscopic artwork with both the scenes and the external environment of the interactive sculptural work.
4. Develop the recipient's artistic culture by applying interactive sculpture.
5. Analysis of the theoretical frameworks of the concept of movement, its types and uses as an aspect of enriching interactive sculpture.
6. Finding some entrances to develop the level of students cognitively and skillfully by taking advantage of the movement in building an interactive sculptural form.

Importance of Research:

- Revealing the aesthetic values of employing the relationship between the movement element and the visual dynamics of the stereoscopic shape.
- Identify the role of technology in enriching the design of interactive sculpture.

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- Enriching the knowledge and practical experience in the field of sculpture that benefits research students with regard to the aesthetic employment of the movement in interactive sculpture
- The research contributes to giving a vision to those in charge of teaching sculpture to exploit the opportunities of immersion in interactive sculpture work in Shaping the learner's personality artistically and developing his artistic taste.
- Identify some of the works of interactive sculpture.

Research Limitations:

The study is limited to:

- Human Limits: Conducting research applications on 11 third-level students.
-Spatial boundaries: Faculty of Specific Education - Department of Art Education - Matrouh University
-Time limits: Academic year 2023/2024
- Study of interactive sculpture and its types.
- Study of movement and its types.
- The applied research experience is limited to the use of wood raw material and its color treatment.
- The research is limited to providing a training unit with many practical applications to achieve the dynamic vision of the art of three-dimensional stereoscopic formation for third-level students in the Department of Art Education, Faculty of Specific Education, Matrouh University, which aims to produce interactive sculptures based on movement in order to open new and diverse artistic horizons for art education students.
- The study of kinetic sculptures of some sculptors, which contain an artistic composition that expresses a topic related to kinetic sculpture, and the study included stereoscopic sculptures with different materials, topics and various methods.

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:

The research is based on the study of contemporary sculptural works that illustrate the sculptor's ability to achieve aesthetic values by employing the element of movement in interactive sculptural creations through:

1. Study of equilibrium and motion in formation and composition.
2. A study of the concepts associated with the movement and its types.
3. A study of the concepts related to perception and vision, and their relationship to plastic artwork, especially the stereoscopic ones, and the impact of contemporary technological design on it.
4. Dealing with the concept of interactive art and its relationship to plastic art.
5. Exhibiting examples of some of the artists' works that used interactive sculpture.

Second: Applied Framework:

The practical applied aspect includes a sample of third-level students at the Faculty of Specific Education, Department of Art Education, Matrouh University, in the light of the results reached by the researcher during the theoretical framework of the research study, which aims to show the philosophical

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and creative dimensions of the dynamic of balance and movement in the formation of an interactive sculptural work despite the contradiction between them, we find that the relationships resulting from the chanting of wood slats or any element of the constituent elements of the sculptural work represent a rhythm that suggests vitality and dynamism, so we note the kinetic rhythm of the lines In the work resulting from repetition and gradation or in the sequence of lines with their movement, which in turn homogeneous and consists with the balance between those blocks, spaces and lines are one of the important elements in the composition and multiple expressive significance curved line suggests containment and closure while the line Zigzag suggests movement and refracted refraction and straight hardness and stability.

-The intellectual premise of the experiment:

The idea of the experiment was based on the design and implementation of contemporary interactive sculptural forms, in which the element of movement represents a multiplicity of forms of vision for one work and plastic features with abstract geometric properties through the interaction of the viewer manually with the sculptural work.

- The plastic premise of the experiment:

The research tended to use the program (Corl Drew) to provide a number of four designs for interactive kinetic sculptural forms, relied on the employment of structural formation slide as an abstract method, as the MDF wood slice of shapes that have the value of plastic sculptural, and achieve unity of form and content, and the strength of the slides in contemporary interactive sculptural works by forming the space, filling the surrounding space, and its plastic ability to achieve the plastic and expressive concept of space through intellectual and technical entrances in the formation as a constructive medium in Various states (planar, repeated, and superimposed)

The importance of the experience:

1. Learn about the types of interactive sculpture.
2. Finding multiple approaches in dealing with the compositional formulations of moving sculptural formations.
3. Clarifying the dimensions of the use of raw materials in light of the use of compositional formulations for interactive sculptural formation.

- Limitations of the experiment:

The researcher applies a practical experience to the students, in which the researcher deals with the results of the analytical study of the models of sculptural plastic works based on the geometric compositional style and the consequences of the theoretical framework for research in the design and implementation of an interactive sculptural work implemented by the students of the third level of the Faculty of Specific Education, Department of Art Education, Matrouh University, and their number is 11 students to produce interactive sculptural works by one work by one work at least four different forms depend on the formulation of interactive sculpture kinetic manually And to emphasize that the formation is abstract geometric three-dimensional stereoscopic wood material, provided that one of the dimensions of the work ranges between at least 50 to 70 cm.

-Time limitation 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.

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- The experiment in the application of the work takes four interviews, during which an abstract geometric formation is produced with MDF wood material in a three-dimensional model in a synthetic form for an interactive sculptural work assembled in a linear geometric form by a work for each student in an area ranging from 50 to 70 cm. This period is considered sufficient to conduct the experiment because the subject of the experiment takes more time to think than the time of implementation.
- The experiment takes place in the first and second half months of the second semester of the academic year 2023-2024 to benefit from the accumulation of knowledge and skill experiences in achieving the results of the experiment.
- The experiment takes place in the classroom designated for teaching the curriculum of the third year of the selected division as a sample for research, as the place is prepared appropriately in terms of the availability of lighting, tables and seats.

- Formative limits of work:

-The experiment is carried out using MDF wood material and dealing with it using cutting methods and direct geometric formation as a methodological basis in the study of the third level.

-The experiment is carried out using manual coloring techniques that suit the student's work idea and deal with it using synthetic formulations according to what is required to implement the idea of creative work in terms of emphasizing the element of movement.

Unit Title: Dynamics of actual movement and its aesthetic applications in the field of interactive sculptural formation

Unit Field: Stereoscopic Formation (Carving).

Philosophical foundations of unity: the impact of the movement element on the stereoscopic formation to create contemporary interactive sculptural works**.**

Unit Objectives:

1. Providing the trainee with artistic concepts and technical skills related to contemporary interactive sculptural formation.
2. The impact of technological development on stereoscopic design techniques.

Unit sample: A group of (11 students) from the third level students - Department of Art Education - Faculty of Specific Education - Matrouh University.

Unit time: 24 hours.

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

Materials & Tools: MDF Wood Piece, Galvanized Iron, Plastic Colors, Cutting Tools, Reciprocating Electric Arct Saw, Hand Arct Saw

Teaching aids:

- Pictures and illustrations of the phenomenon of movement in sculpture.
- Images of artworks executed by interactive sculpture.

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

Calendar: A phased calendar after each interview**.**

Final evaluation after the end of the training unit.

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

First: Cognitive Objectives:

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

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-Learn about the laws of motion and equilibrium and how to benefit from them in interactive sculptural formation.
-It recognizes the physical properties of wood material as a technique that adds to contemporary sculpture a formal and aesthetic effect.
-Recognize the concept of shape dynamics in interactive sculpture.
-It can achieve stereoscopic shapes and shapes with its material (MDF wood) characterized by interaction with those around it from the environment and the recipient.

Second: Skill Objectives:

-The design is transformed into different plastic elements and variables for one work based on the principles of geometric abstract art in a design commensurate with contemporary interactive sculptural formation.
-Achieves plastic values in the design of interactive sculptural work using computer programs , to achieve the dynamics of vision in the sculptural form through the work of more than one perception of it.
-The student designs a stereoscopic work through the mathematical organization of its parts.
-Distributes wood colors to the design before starting implementation.
-Develops a vision and solutions to the technical and technical problems faced during the implementation process.

-Contemporary interactive sculpture works are employed in line with the needs of the times and the labor market.

Third: Emotional Goals :

- He cherishes the interactive kinetic sculptural work and feels a sense of belonging towards it.

-Respects and appreciates manual work .

-Take into account accuracy and proficiency in the implementation of interactive sculptural work and emphasis on the dynamics of work. .

-He expresses his opinion on the use of abstract plastic elements and vocabulary and what they will add from the dynamism of contemporary sculptural work .

-Taste the plastic and aesthetic artistic values found in the elements and vocabulary of abstract art.

-He wants to continue and experiment in the sculptural work.

-The student raises new points in the explanation about the manual movement and its results on seeing the shape.

-Art is respected as a value that works to marry science and beauty.

Unit Concepts:

1. Actual movement: Actual movement

Nicolas Rouks defined the concept of actual motion in modern art as "the movement of parts of works from one point to another at a given time by industrial forces such as motors, moving artificial light, magnetic forces and natural forces, some of which are represented by air currents and fire." (Nicholas Rouks, 1974, p. 15)

"The actual movement is the movement enjoyed by living beings in nature and cosmic phenomena such as wind and sun, as well as is the industrial movement in different forms, which was used by man such as machines, vehicles and airplanes, and this movement has been allocated a stand-alone science called "kinematics", which is the science that examines the movement of bodies as caused by the forces affecting them, and movement includes the sciences of distance and time. "(James Mark Bolden, p. 13)

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2-Kinetic sculpture: Kinetic sculpture

Kinetic art is one of the arts that made the interactive movement an effective role in the artwork through driving forces, whether mechanical by hand or electric with buttons and keys, and this trend requires the artist to conduct scientific experiments next to his theoretical information to produce works that deepen the relationship between them and the viewer so that it becomes a direct communication relationship, so he worked to include interactive movement in the formation freely, so it raises the viewer's sense and interacts with the work, and in kinetic art the three dimensions appear in addition to the movement Kinetic art relied on the relationship between art and science, using all kinetic forces to produce an integrated art that includes music, form, movement, sound, light and the participation of the viewer in an interactive way to express the arts of the current era (Mohsen Mohamed Attia, 2001, p. 92).

"Art that contains movement, but not the direct concept of the word movement, means that every work that contains movement or is interested in representing it or forming movement is an integral part of it that belongs to kinetic art, so it is not enough to differentiate between the representation of movement and actual movement to distinguish between kinetic sculpture works and other works that involve movement." Gilles Nerct, 1988, p. 151)) Figure (3)

Figure (3)
Nicholas Schover N. schoffer Kronos (8), Pure Steel - 1967 engines, 3.8 – 4 ft × 1.25 – 4 ft
(Denial Wheeler, 1983, p. 242.**)**

Therefore, not all works that move are considered kinetic art, and not all kinetic works move in the strict sense in which the term movement is used, because the work in kinetic art must be characterized by other characteristics besides the availability of the element of movement, that the movement produces a kind of effect, and not necessarily that the work itself moves, as the effects of movement can be produced by the movement of the viewer in front of the work or to move it. (Beer F.P. and Johnston E.R., 1987. P.12)

3- Interactive concept:

Lexical meaning: a source of interaction in which they have become a continuous interaction and mutual influence (rich lexicon).

Idiomatic meaning: It is used to denote different types of reactions, that is, it is the relationship between two things that are independent of each other or more, or a system of change that develops, prevents or determines the influence of one on the other.

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The concept of interactivity is defined as a process, function or property developed by man in its design, for physical or virtual purposes and is characterized by its ability to sense and then respond by signal, dynamic movement, changes, or expressions in the psychological desires and physical states of man, or the environmental situation or changes in geographical location and is also known as an interchangeable communication with two elements, the first of which is the sender and the second of which is the receiver, so that it is difficult to distinguish between them in the process of interactive communication, taking into account the goal of communication, and the direction, message and time. (Mr. Zaki et al., 2016, p. 162.)

4- Interactive art:

Interactive art appeared in the early twentieth century, and it is a means that achieves communication between the artistic work and the recipient and reflects the depth of human feelings, so the artist seeks creativity and innovation, whether in the development of performance technique or his artistic vocabulary, to achieve aesthetic values in the work of art, and interactive art is one of the most artistic trends that are concerned with language, communication and achieving interaction for the recipient. Interactive art depends on the interaction between the artist and the audience, and interactivity is represented in moving from the stage of the traditional idea of the artistic product to the stage of the idea of building the work With aesthetic values and dynamic movement, interaction is a modern language of communication. They can be identified through key inputs, including various electronic and traditional media used. (Noureddine et al., 2016, p. 536)

5-Interactive Sculpture:

Artists and their different types of art differed in the definition of interactive art:

"Jean-Louis, Bouissie considered the interactive arts to have a special relationship with work, which itself is related to the operation and use of computers (www.hisour.com/ar/interactive-)

For Annick, Boriod, interaction refers to the relationship between electronic computer systems and their external environment, and interactive action. It is a manipulable media object, and two records of interaction can be distinguished: one with a human factor and one without a human factor. In this second case, the worker may be elements of nature or the environment, with interactive art, the viewer and/or the environment become elements of the work, in the same way as the other elements he composes" (www.hisour.com/ar/interactive-art-21343)

-Procedural definition of interactive sculpture:

Interactive sculpture is one of the modern artistic trends that have the possibility of influencing human concepts and behaviors, it is the basics of interactive sculpture that the viewer interacts kinetically or automatically with the two- or three-dimensional model, and makes a change in the shape and perspective of the stereoscopic affecting the intellectual concept of the viewer and reaching the thought and vision of the sculptor that shows the real reality of the sculpture and simulates the imagination.

6- Interactive sculpture design

We can start from the definition of interactive design, which is the design that connects the artwork and the recipient in any way of communication, where the artwork is dealt with through participation by the viewer in the use of those arts and interaction with them, and interactive art has spread recently as well as the use of digital technology in it, which gives greater possibility for the participation of the public, linking interactive art between the work and the viewer, whether by manual interaction or through a modern programming method as we mentioned before, and art Interactive may also require the viewer to become part of the artwork to interact and clarify the idea of the designer, and the interaction of the artwork with his surrounding environment and response to it can fall within the limits of the definition of interactive sculpture or in general interactive design and the use of smart materials in the manufacture of artwork helped to achieve that interaction.

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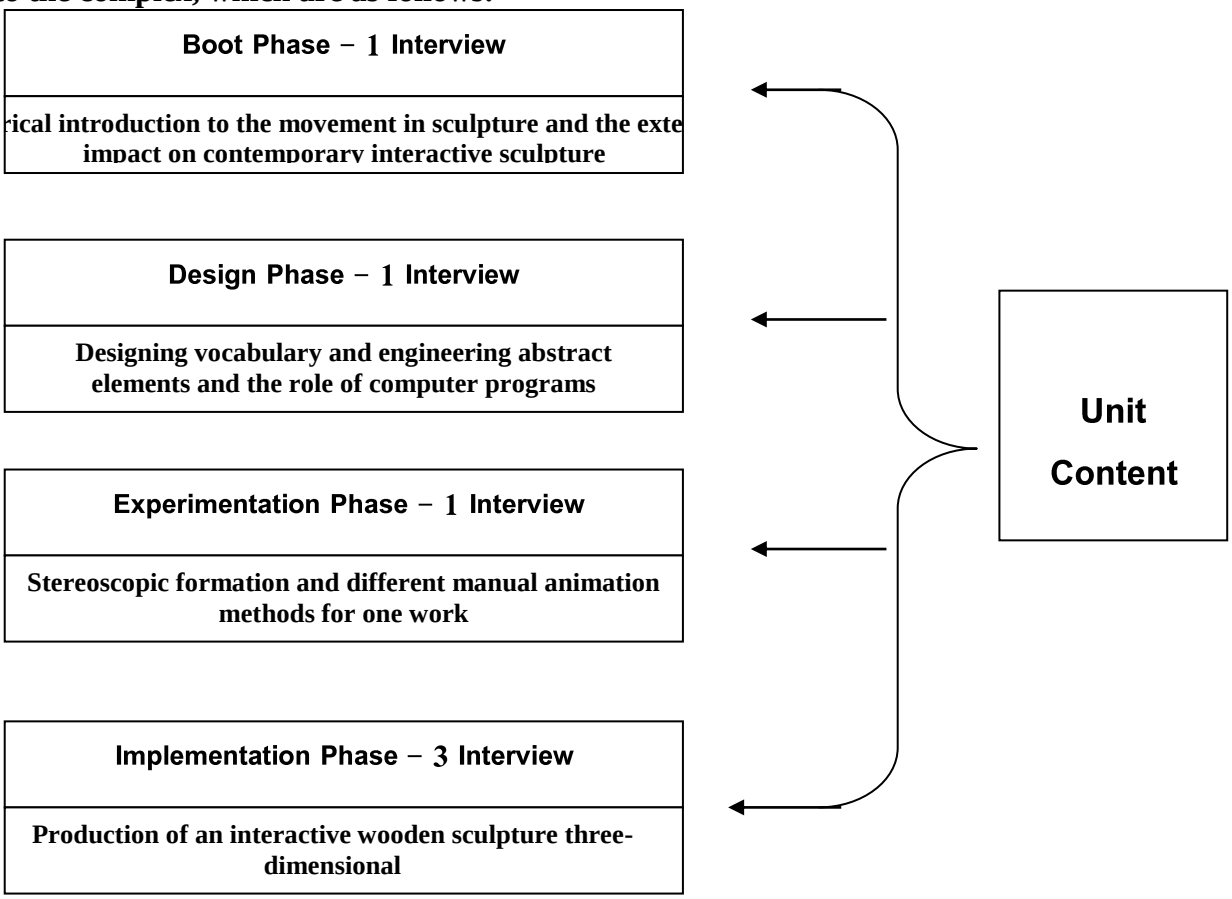
7- Dynamic vision:

If dynamics is defined as "the science that specializes in irregular motion or variable motion (evolving motion or irregular variable motion, variable motion) whether in terms of magnitude or direction" (Alaa El-Din Hamdy, p. 11)

The dynamic movement in art is evolutionary and means the rhythmic movement with a continuous changing system, and that change and diversity in the vision and perception of the anthropomorphic artwork gives an exciting sensation that attracts the viewer's attention, opposes boredom and adds a more effective aesthetic value to the artwork.

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:

- **<u>The first interview</u> : a historical introduction to the movement in sculpture and the extent of its impact on contemporary interactive sculpture.**
- **<u>Objectives of the interview:</u>**

-Introduce students to the concept of animated and interactive sculpture.

-Reveal the dynamic importance of interactive sculptural work.

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-Emphasizing the importance of movement and balance as one of the entrances to artistic creativity in interactive sculpture.

-Introducing students to the arts of three-dimensional stereoscopic formation and the role of the viewer in it.

- **Conduct of the interview:**

Students are asked about the dynamics of vision in kinetic and interactive sculpture, what are the types of wood, types of movement and dynamic balance in contemporary sculpture, types of interactive sculpture, and is it possible to employ MDF wood in sculptural work, then the trainee begins to clarify some entrances, for example:

- **A new concept for the receiver:**

Modern plastic arts have provided the viewer with a positive role, sometimes reaching the point of actual participation, and the events of variables within the artwork, until the role of the viewer became part of the interests of art when creating the artwork and some works were carried out in ways that make their parts amenable to movement and change by the viewer to allow modifying the shapes, colors and relationships of the artwork according to the viewer's own vision, which provided the opportunity to issue aesthetic judgments and develop his independent taste and is no longer just a recipient of the artwork as much as he became an active participant In view.

- **Definition of dynamics:**

Definition of the Dynamic Art Encyclopedia:

It is originally derived from the Greek word (dynamic) which means force and energy and is a branch of mechanics which means the effect of forces on moving bodies (Runes (D.D.) Suhrickel (H.G), 1946, p 294).

Aristotle also defines dynamism as the act of what is by force with what is by force in the sense that dynamism is the effect of forces on bodies that are in motion affected by a previous force and this movement changes.

-The importance of dynamism for interactive sculptural work:

Dynamism in the field of plastic art means rhythmic movement with a changing and continuous system, that is, the change in the rhythmic system of the movement of plastic vocabulary "and the dynamic movement is a measurement of each movement in the development and change" and therefore it is considered an important basis in the construction of the work of art, as without it there is no movement, nor artistic style in dealing with the vocabulary of formation, and therefore dynamism in plastic art was known as the meaning of rhythm, which is mainly one of the well-known foundations of design and formation.

The fine artwork deals with a group of different rhythms, and one of these rhythms is more dominant than the rest of the rhythms, and thus represents the focus of the artwork (the center of sovereignty, or the point of influence), while the rest of the other rhythms represent the complementary elements that contribute to the diversity of the artwork and work to give it a distinctive artistic character.

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- Equilibrium and motion in formation and composition:

Equanimity and movement are important and influential aesthetic values in the formation and composition of sculptural work, despite the contradiction between them. We find that the relationships resulting from the repetition of blocks or spaces or any element of the component of the sculptural work represent a rhythm that suggests vitality and dynamism, so we note the rhythm of the movement of the lines in nature from their repetition and gradation, as in the leaves or in the sequence of lines in the waves, suggesting their movements and blows, which in turn harmonizes and consists with the balance between those blocks, spaces and lines. The lines are one of the important elements in the composition and their expressive significance is multiple, the curved line suggests containment and closure, while the zigzag line suggests movement. and refracted by refraction and straight by rigidity and stability.

In Figure (4) it represents the kinetic attraction point of formation and achieves dynamic equilibrium as a result of the control of this part on the formation, which in turn leads to balance in the axes of movement around the fulcrum represented by the point of attraction as follows:

Figure (4) The control of the element as a kinetic attraction

- **Balance:**

Equilibrium is a key factor in the integration of the construction of a sculptural work and is usually due to the relationship between the parts of the bodies, man always tends to feel balance and would always like to achieve it in the work of art. Equanimity is achieved as a result of the artist's organization of the elements of the form, it is achieved only by a set of rules, which may be balance in large or small blocks or equilibrium in space and its relationship to mass or balance in color or texture.

- **Movement:**

Movement is one of the manifestations of artistic formation and its foundations, and it represents the dynamic aspect of life, the concept of dynamism refers to movement in design, that is, to the path followed by the eyes when realizing the design, it includes two ideas of change and the other is related to the time it takes, one of them is related to this change, and the change may occur objectively in the visual field or mentally in the process of perception or both, and the kinetic trend focuses on finding aesthetic values such as balance, rhythm, depth and contrast, depending on linear formations and organizations Due to the difference in areas and color contrast, sculpture derives its kinetic value from its outer linear boundaries (external shape), or from its vertical axes that direct the movement in a certain direction. Horizontal elements usually indicate a state of stability, while vertical elements always appear balanced despite their dynamic charge saturation, and axes with different directions, whether visible or hidden within the figure, have a great impact on emphasizing movement. (Walaa Hamid Mohamed Hamza, 2106, p. 152)

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-The concept of movement philosophically and artistically:

The concept of movement philosophically : Philosophy discusses movement as an independent subject with a metaphysical entity and analyzes its elements and examines its connotations and provides movement as a philosophical concept on the analysis of different angles of movement from one place to another and from one region to another as the movement of creatures on the pages of life and is called transitional movement and from angles of movement through conditions and multiple images such as the transition of plants from one phase to another from the angle of looking at things that the changes that occur are just movement on the virtual surface and the essence remains fixed It is the concept of truth behind every change (Aristotle Thales, 1949), and Aristotle is the first philosopher in the history of philosophical thought to search for movement through the formulation of an integrated theory of movement, asserting that movement is the necessary prelude to the knowledge of natural science or supernatural science and was not the ultimate cause of movement.

The concept of movement artistically: The movement in the artistic composition is important because it leads the sense of sight to all parts of the artwork to settle to the point of sovereignty, and the movement suggests balance and lack thereof, and we do not exaggerate if we say that the movement gives dynamism to everything, even the static element, and in the works of art, the movement is divided into two parts:

A-External virtual movement: We extrapolate this movement through the composition of the artwork and the relationship of its elements with each other, so the movement of the form is a fixed representation, i.e. capturing the scene at a specific moment during the changing time, or embodying the famous during a certain moment of time fixed, and this is what Alan Chartier pointed out when he said: "Sculpture can be certain as photography and painting represent a movement through positivism, we just have to know that if not such a representation assumes the existence of a test or Even creating a pose, rather than imitating a moment of movement (Paul Klee, 2003.) This helps to confirm the concept of the fourth dimension (time) in sculpture through movement, and the artwork here can derive the energy of movement from several sources of mechanism (engine) that gives a kinetic form with a constant frequency adjusted, or natural in which the form of movement arises spontaneously unexpectedly. Here are many sculptors who used this concept of movement in works of art and sculpture as well (Zakaria Ibrahim, 1977).

Hauser points out that the virtual movement, or more precisely the virtual form, has great importance since ancient times, so the virtual form is the language of thought and the means of expressing the content and idea, and this is evident since cave drawings and sculptural works in other civilizations until it was said that the oldest manifestations of artistic activity is art based on formal principles (Arnold Hauser, 1981, p. 13).

B. Internal movement : The construction of the shape begins through a point, that is, from where the diagnosed shape begins, from the point that begins to move, and the point as an active entity moves and asks about its transmission of the line, and this is the first dimension, and when the line moves with all its points, the two-dimensional surface arises, and so the second dimension arises, and with the movement of the surfaces and with their confluence as well, the three-dimensional hologram is formed , These stages in the construction of the artwork must be born through the kinetic sense is the sense of movement of members and their internal changes, the movement of the point from one site to another for the manufacture of the line and the formation of the surface through the movement of lines and sizes

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through the movement of surfaces, all of this needs a specific time through which the sense of the concept of place is achieved (Ziad Salem Haddad, 1998), what gives the artwork its dynamic temporal character is the organization of its elements consisting of which include kinetic energy in which Movement starting from the consonant, so the temporal is achieved starting from the spatial. This organization imposes a kind of unity on the work of art despite the different movements and forms of the elements composing it, and here the rhythm factor enters to play its role in determining this unity (Salbia Jamil, 1982).

-Movement in Contemporary Sculpture:

The movement is a formula of sculptural formation, extended in time as it extended in space, because it illustrates the ability to express freely when distributing the elements of formation in new dimensions, that is, it is the language in which the artist expresses his awareness of the reality of the void and the potential of his plastic vocabulary, and the research aimed to study the analysis of theoretical frameworks for the concepts of movement and its relationship to scientific theories and actual movement and interactive movement in contemporary sculpture. The research dealt with the study of a set of important points related to the subject of the research, a study to carve some of the trends expressing Movement in Modern Art The research also dealt with movement and rhythm in modern and contemporary arts. The research concluded to an important conclusion: that the movement is an important source of interactive sculptural formations through the integration of traditional plastic elements and the elements developed in the sculptural formation, as the research reached the value of the movement in formation and achieved through time as a fourth dimension in contemporary sculpture.

Movement is defined as the transition from one point to another in a given time, also known as dynamics, and refers to the relationship to natural force or energy. As for the concept of dynamism for the artwork, it is the stimuli stemming from movement inside or outside the work and the resulting responses to the behavioral concept of interaction within the connoisseur (Lotfy Mohamed Ali, 2018, p. 134) The theory of relativity (Einstein) made a huge revolution that affected all scientific and artistic concepts, as this theory had a great impact on the transformation of thought. The human from a fixed thought rigid to the thought of absolute liberal believes in change and inevitability, has confirmed Einstein that time and space united and connected in perception, where Einstein interested in the subject of movement and its relationship to the assets in the universe and the development of his own and public theory, which was later known as Einstein's theory of relativity.

"The movement became an artistic direction with a special entity that interacts with the times, in which the recipient plays an important role through interaction with the components of contemporary sculptural work" (Mahmoud Bassiouni, 1983, 101).

The work of art (sculptural) can "contain a latent power within the elements of the abstract composition, whether line, color or space, these elements alone without expressing a specific formal element are able to arouse kinetic sensations in the viewer" (John Dickerson, 1989, p. 216), hence the philosophical jurisprudence in the modern era reflected multiple concerns about the meaning of movement and the need to receive the artwork in the light of the contents it reflects related to the movement and the vitality it gives to the forms.

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-Movement and its types in contemporary sculpture:

The existence of movement in contemporary sculpture, whether in composition or in the formation of a single sculptural vocabulary, the question of form is that it is the movement from the small unit to the contemporary sculptural form and from the contemporary sculptural form to other contemporary sculptural forms that collectively form a continuous field of view.

The viewer looks at the artwork from "one artistic unit or form to another in all directions until he sees the whole form from end to end and considers the composition in fact an independent and self-contained whole" (Alexander Eliot, 2002, p. 98). The more shapes and units become densely and closely superimposed, the more the connoisseur is forced to move and stop together.

The movement in sculpture has laws that push us to show its features, the human body has the basic movement and internal and external changes in the construction of architecture have an actual movement, and space has movement and every phenomenon in nature has movement, and the movement in art includes two ideas, change and time, change may occur objectively in the visual field, or mentally in the process of perception, or both together, and time here enters in all cases. Some arts include objective movement, and in other arts, movement is present in all Aspects of perception and have a special characteristic" (Frank Yoir, 2019, p. 18), and the movement in art is divided into four types as in Figure (5)

1. Actual Movement 2 - Interactive Movement -3- Discretionary Movement 4 Illusionist Movement

1- Actual movement:

The actual movement is a formula of the formation of the idea in the sculptural form, extended in time as it extended in space, and the actual movement illustrates the ability to express freely when distributing the elements of the form in new dimensions, that is, it is the means by which the artist expresses his awareness of the reality of the void, and the possibilities of his plastic vocabulary, and with the designs of the modern era lies in it aesthetic values and a necessary plastic requirement and should not be devoid of any work of art, and it must be an interactive presence that increases the strength of cohesion and unity Between the parts of the artwork (Lotfy Mohamed Ali, 2018, p. 11)

- Types of actual movement:

Actual motion is divided into several types, including linear rectilinear motion, rotational motion, spiral movement, reciprocating movement, articulation movement, and regular movement.

A. Linear rectilinear motion

"Straight motion means that an object moves on a constant straight line. That is, the body moves from one point to another in successive times, provided that all the points that the body passes through are located on a straight line." (Ibrahim Fawzy, 1995, p. 124.)

B- Rotational motion

"The rotational motion of any body is intended to move so that it follows a circular path around a fixed point and this point may be fully fixed in the vacuum and may also be instantaneously or temporally fixed so that it changes from moment to moment and is then known as the so-called instantaneous center." (Ibrahim Fawzy, 1995, p. 145.)

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C-Helical movement

"It is the movement of rotation around a fixed axis accompanied by a movement of transmission in the direction of this axis, and it is required that the ratio between the rotational and transmission speeds remains constant during movement." (Ahmad Riad Turki, 1968, p. 509)

D. Reciprocating motion

"It is a movement that occurs in two opposite directions, and in equal times, such as pendulum motion, straight reciprocating motion, whether horizontal or vertical, and circular reciprocating." (Ahmad Riad Turki, 1968, p. 283)

E- Articular movement

"It is fixing a point of the body so that it can rotate around it."

F-Organized motion: Organized motion

"Uniform motion means equal transition in equal times and in one direction." (Bush, 1990, p. 25)

2- Interactive movement:

It is a movement that aims to interact with the viewer with the work of art, either by moving the artwork in order to establish a dialogue with the blocks, flats, light and shadows that move by pushing the hand, or by moving the shapes by assembling or fragmenting them according to certain conditions and rules determined by the artist or leaving them for the viewer to interact with , which surprises with the emergence of new influences and changes to the compositions of sculptural forms and formations.

Divided into:

A- Actions that move by pushing the hand:

Some call it variable motion, which is related to the actual movement that turns into actual movement by the viewer as a result of moving the parts of the artwork and changing the angle of view. "This is the direct interaction reached by the artist to experience the viewer with the work of art in the same place and time, and this is the positivity of the arts of the twentieth century and the expression of the spirit of the age, which is characterized by rapid movement in everything" (Abdel Ghani El-Shawl, 1989, p. 43).

The beginning was the interest in the participation of the viewer in the artwork to achieve movement when multi-angled and colored slides were used, and through the movement of the viewer in front of the work sees new combinations, and different relationships with each movement moves in front of the work, so his vision of the relationships of the forms changes, hence the goal of the actual movement and the output of the traditional work from the field of movement inspired to the field of actual movement so that the artwork is honest and expressive of the character of his time (Abdul Rahim Ibrahim, Mervat Zaki, 1992, p. 60).

b) The use of electromagnetic forces to actually move the work:

The artist took advantage of all areas of technology surrounding him in order to achieve the element of movement in his works, and there were many means to employ modern science in these works, and among these means is the electromagnetic force used by the artist, and thus makes the work liberated twice, the first through its movement and the second through its liberation from gravity, which controls all works, even moving ones, with other forces, and through that we find that this force is distinct from other types of forces

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c) The use of mechanical forces "engine" to actually move the work:

Recently increased the use of mechanization in works of art to suit what is in life, where the artist's interest in this entrance is clear until it reached its peak at the end of the twentieth century and the beginning of the twenty-first century in an effort to find a new language for the contemporary sculptural form, has used sculptors mechanical movement engine in a variety of purposes to take advantage of the idea and content of the machine and its entry into various areas of life, and this thought diverse trends vary between wit and poetry, the movement of these works was A real movement so that it develops and varies in time and with time, it is considered a record that gradually opens its pages to the viewer.

- **Interactive Motion Systems:**

A system is a method that organizes a number of elements into relationships that serve each other so that they appear in a local unit and these elements move in diverse and distinctive forms.

They are:

A - Movement within the work:

Straight movement : It is for the viewer to move on a straight line between two points, whether this line is horizontal, vertical or oblique.

Circular movement **:** It is the movement of the viewer to follow a circular path around a completely fixed or variable and instantaneous point, then called the momentary center.

Free movement: It is the movement of the viewer within the work in a variable and varied range that is not predetermined by the artist and is not repeated by other viewers.

B- Movement in front of work:

Horizontal movement: It is the movement of the viewer in a straight line in front of the work left and right.

Vertical movement: It is the movement of the viewer in a straight line in front of the work forward and backward.

Semicircular movement: It is the movement of the viewer in front of the work on a line that forms an arc or semicircle so that the work represents the center of that circle

C- Movement of work parts:

Inside the workspace**:** It is for the viewer to move one of the parts of the work and move it to another place within the scope of the work.

Outside the workspace: It is when the viewer moves one part of the work and moves it in another place outside the scope of the work.

Reconstitution of the work is that the viewer animates all parts of the work in order to recreate it again by installing its parts specifically by the artist or free by the viewer.(Mai Mohamed Saeed Muharram, 2019, p. 1810.)

1- **Discretionary Movement:**

The discretionary movement, despite its stability in the field of clairvoyance sculpture, but it is in the mental aspect estimated that it is a movement, according to the culture and taste of the recipient or viewer, the more the viewer has a high artistic culture, the more he estimates the movement of the forms in front of him and the trends and equations of these elements, unlike the illusionist movement that affects very quickly the retina of the viewer or the recipient, whatever his culture, and although both arise from fixed plastic elements, but in the illusionist movement it happens that The plastic elements attack the eye network and enter more than one image in the mind in a quick way that makes the mind at a loss, as for the estimated movement, the plastic elements in the sculptural composition give a sense of movement, and the viewer tries to link these elements through their directions, flats, colors and paths,

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because they have arisen in his mind movement, so he tries to explain the interdependence of the elements, their exchange, trends and rates in the contemporary form, "The movement is an act that involves change and therefore is offset by an internal reaction that is raised in the form of sensations, the movement It may indicate that danger is imminent or indicate the expectation of good news, both of which evoke different sensations and emotions" (Alexander Elliott, 2002, p. 297). The discretionary movement and the logic of relativity is also subject to increase and decrease, the more lack of fragmentation, reduction and cracking in the sculptural form, as is the case in the impressionist school and brutality, the more the movement is slow and is said slow discretionary movement.

2- Delusional movement:

It means optical deception of movement in the form of sculptural where it seems to us fixed shapes as if moving, and means the movement illusion movement is not real and that arises from the tricks of optical illusion from our point of view there is a difference between the movement illusion and movement estimated and actual, illusion is known as unreal and is produced from deception, and this type of movement illusion known in the arts of optical illusion term Opart, and the artists of this trend have relied on the theories of perception and physiology of vision and geometric mathematical equations Some critics have called the art of op art the art of the responsive eye, because the form in the visual field attacks the retina by introducing more than one mental image in a quick way that makes the mind confused and results in vibrations that in turn occur the illusionary movement, and whatever the culture of the viewer, he realizes this movement as a deceptive illusion and also realizes that the shapes that move in front of him are in fact fixed.

- Formative structure in kinetic sculpture:

Kinetic art is defined as the art that is able to cover many classifications of the visible thing, there are works that move or change despite their stillness in fact be in two or three dimensions, and there are things that move at their whim without control of mechanical force, such as Alexander Calder's moves, and there are works that work mechanically and in which electric magnetic lights or water are harnessed sometimes) (Salah Fadl, 1987), so the sculptor within the scope of this structure must create a kind of experiments with the entity of its general sculptural mass and its multiple aspects and the factors linking it and the influences on its internal and external composition to achieve rhythm or kinetic character in all its aspects and directions (descending - ascending - front - back - side - internal - external) so that all components of the work engage in this direction so that the formative structure can create or achieve the desired goal of using it as a constructive means and this occurs interaction between the intellectual content For sculptural work with the general formative structure after achieving associative relations between the general components and in return give the recipient a kind of tension and interaction between him and the work and what illuminates the way in making an impact on it and this is what develops the bonds of communication between the trio (sculptor - work - recipient) and what happens as a result of the general kinetic character of the sculptural work, which interacted in order to achieve the curves of the lines and then led her surfaces looked globbed with gradient shades from light to value with a transfer movement Quiet for shadows and light In addition, the kinetic progress forward led all those other directions and attracted the recipient to the kinetic axis in the work and what the sculptor hopes from behind that kinetic transformation (Magdy Wahba, 1974, p. 16)

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The rhythm of movement in the artwork:

What gives the work of art its dynamic temporal character is the organization of its composed elements, which include kinetic energy in which there is movement starting from the static, so that temporal is achieved starting from the spatial. This organization imposes a kind of unity on the artwork despite the different movements and forms of the elements composing it, and here the rhythm factor enters to play its role in determining this unity, and Zakaria Ibrahim refers to this and says: When the artist manipulates the similar and contrary elements of his subject, he may be able to create a special rhythm on his artwork that gives it a vivid temporal character. Here comes repetition, repetition, symmetry, symmetry, and symmetry, all of which are artistic phenomena that help to highlight rhythm, show diversity, clarify novelty, and evacuate the element of time, and when the rhythm factor is implemented to the heart of the material, it is then impossible to a subject that is aesthetic [aesthetic] that enjoys a temporal way" (Ibrahim Zakaria, 1977, p. 31), and the laws of rhythm and equilibrium that are reflected in the movement of bodies in nature, the movement of the human body, for example, are also reflected in works of art, rhythm as Hassan Suleiman says: In its simplest form, a regular movement like a heartbeat, a movement bounded by a fixed law. (Suleiman Hassan, p. 94)

The recipient understands the concept of movement in the sculptural work through the following:

The first: is the movement of personalized forms as found in the iconic realistic forms called simulation, and here the recipient can measure the similarity between the accomplished and the original, and here the concept of the movement of the form is clear and declared.

The second is the movement of undiagnosed forms, most of which are expressive or abstract, and the level of measurement of their movement is according to the level of perception of the recipient, which is present in the works of modernity and postmodernism. (Nasr Allah, 2008, p. 149)

- ## Interactive Sculpture:

It is one of the types of arts where the artwork is dealt with through participation by the viewer in the use of those arts and interaction with them, so the artist's view of art is no longer traditional, but the designer artist always remains looking for everything new and what makes him reach the recipient in a more interactive way, and the role of art is not limited to delivering the designer's message to the recipient, but extends to reach the recipient's ability to formulate the message and to express what he has reached and what he feels as well, the extent of the ability of The audience watching to participate in the interaction with the artwork spreads the culture of artistic sense among different groups and thus the community becomes a good connoisseur of art as a whole and of the artwork as a part.

Modern art tended to the public's need to interact with works of art, so he began to think about producing works of art of an interactive nature, the emergence of interactive design is talked about by Bill Mugridge, he says: "I felt that there is an opportunity to create a new design concept, directed to the creation of imaginative and attractive solutions in a visual world, where the individual can design behaviors (a kind of movement and sounds in addition to shapes, and this type of design will be equivalent to industrial design, and as in industrial design, the beginning is from the needs Humanity and desires of users of services and products, as well as diligence to create designs that achieve aesthetic

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value in addition to satisfaction and enjoyment, and the first delivery of this proposal was at the conference in 1984 and at this time I described this type of design and Bill Fairplan reached the name of interactive design and this term soft face remained "soft software" marginal until the mid-nineties when designers were given great attention to the behaviors prevailing in the world to be in the circle of interest in industrial design, and in this period researchers were interested in topics such as Use, culture of use and human factors and turning them into mechanisms to produce interactive designs free of errors. (Walaa Al-Saeed, 2016, p. 575)

We move here to another term, which is interactivity, and interactivity from the perspective of digital development is one of the possibilities of permanent forces towards the spread of the use of new means of knowledge and digital technology, where Cho classified in 1999 "interaction" in three ways

-Human interaction , i.e. human being .

-Automated interaction i.e. human-machine .

-The interaction of a message i.e. human message.

Based on the previous classification, it can be said that interactivity is the property of the medium, as the interactive medium is the one that provides the receiver with opportunities to interact with the sender and the content at the same time. (Heidi Yusuf, 2019, p. 124)

The researcher defines interactive sculpture as one of the modern artistic trends that have the possibility of influencing human concepts and behaviors, it is the basics of interactive sculpture that the viewer interacts kinetically or automatically with the two- or three-dimensional stereoscopic, and makes a change in the shape and perspective of the stereoscopic affecting the intellectual concept of the viewer and reaching the thought and vision of the sculptor that shows the real reality of the sculpture and simulates imagination.

-Types of interactive sculpture:

When designing an interactive artwork, one of the central issues that an artist thinks about is what motivates people to be socially interactive (such as self-expression or curiosity and exploration), and what positive or negative experiences can result from this, and so artists use many strategies to provide an interesting interaction that brings the audience to the desired goal of the artistic experience, by sharing a group of people related or different reactions, and he has identified (Kluszczynski, 2010) Eight changes in the form of the work, taking on an adventure, exploring a piece of information or technique, playing a game, experimenting with a maze, practicing an activity of interactive art strategies, which can be generally classified into two categories that the same artwork may sometimes combine, namely:

-Interaction using a medium (digital or non-digital), as a control tool or device, which, when moving or moving in front of it, produces a change in the artistic experience, such as creating a sound or light or creating a specific event.

- Interact with physical effort or activity, move or play and try to explore the scene associated with the artistic experience.

1 – Interactive kinetic sculpture by pushing the hand:

Some call it variable motion, which is related to the actual movement that turns into actual movement by the viewer as a result of moving the parts of the artwork and changing the angle of view. "This is the direct interaction that the artist reached to experience the viewer with the artwork in the same place and time, and this is the positivity of the arts of the twentieth century and the expression of the spirit of the age, which is characterized by rapid movement in everything" (Abdel Ghani El-Shal, 1989, p. 43).

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The beginning was the interest in the participation of the viewer in the artwork to achieve movement when multi-angled and colored slides were used, and through the movement of the viewer in front of the work sees new combinations, and different relationships with each movement he moves in front of the work, so his vision of the relationships of forms changes, hence the goal of the actual movement and the output of the traditional work from the field of motion suggested to the field of actual movement so that the artwork is honest and expressive of the character of his time (Abdul Rahim Ibrahim, Mervat Zaki, 1992, p. 60)

2.Automatic motor interactive: sculpture

The machine of all kinds and techniques enters under this title, including:

A.Digital Interactive Sculpture:

It relies on digital technology through the use of screens in digital display and programming according to the concept on which the sculptural work is based, the work is hollow from the inside with cameras that visualize the viewer from all sides and display its images on the sculpture from the outside with the sculpture digital screens that help contain the shape and display the smallest details, which creates an atmosphere of interaction, fun and surprise for the viewer and the audience.

B - Multimedia Interactive Sculpture:

It combines interactive sculpture and multimedia techniques that rely on digital technology of all kinds, programming and its effects on sculpture, for example a two-dimensional sculpture by Daniel Rosen in the form of a fabric of small cubic mirrors with sensors that interact with the viewer, changing their colors and copying the image of the viewer in front of them, and creating a spirit of interaction between the sculpture and the viewer to complete the sculpture its goal.

C - Acoustic interactive sculpture :

. Sculpture by artist "Ambi Pilabelle " by combining interactive sculpture of digital art with acoustic sensors:

The sculptor Belabell was interested in the relationship of the inner "logic" of the structural composition of the different parts in the sculptural work, this appeared in the sculpture "The Third Moon" it is made of shiny stainless steel, and upon seeing it the viewer is immediately attracted to the spirit of work, fun and fun while the viewer notices his face reflected on a surface that resembles a woman, it is literally within the spirit of sculpture.

D.Interactive Light Sculpture:

This type of sculpture combines sculpture and light interaction of all kinds, such as natural light from sunlight and moon or from digital art techniques and optical sensors, and their relationship to technical variables in light, as they are integrated within the sculptural work, Example of interactive digital light sculptures: Dan Rosgaard's "Lotus Dome" is a dome of hundreds of light-sensitive smart flowers composed of light aluminum foil unfolding in response to human behavior ‹This sculpture was placed in the Zedekiah Cave under the walls of the Old City of Jerusalem.

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-Statues and interactive aesthetic works:

Statues and aesthetic works of art are among the most important tools used to spread artistic culture in society, as sculptural works are the closest to employing interaction between them and the audience, Plato said, "You can discover more about a person in one hour of play than a year of conversation." This was the inspiration for Photo 6, an interactive installation in Cleveland by Urban Conga , a multidisciplinary studio that promotes community interaction through social activity, The three pieces of stacked aluminum profiles painted green are designed to represent growth and nature that can be rotated by hand, each part contains laser-cut paintings in different alphabets, so that visitors can turn them to manipulate the appearance of the piece and create words such as voting, knowledge and power, this provides an opportunity for people to participate not only in the work but also with each other, thus creating an enhancement of participation Collectivism as an aesthetic value of the work.

Figure (6) Cleveland interactive installation

Interactive art produces a space for movement and play so that the audience responds together in a dialogue that produces a unique artistic activity, the main goal of interactive art is to convey a pre-designed creative experience to users, which is thought, prepared and implemented after a full study of all possible responses of the audience and the expected way of interaction, this means that the artwork leaves a space of deliberately open interaction to a certain extent, so that an expected range of events and actions can occur to complete the artistic experience, which is a challenge For the artist who thinks about the implementation of interactive works and makes their presence in public places an interesting element for the viewer, and is determined (Zhao Shuwen, Kimchool-soo, 2021, pp. 2947) The characteristics of interactive works are determined in three important points:

-**Synthesis**: This refers to the use of a variety of arts, such as photography and film.
-**Interaction:** Its peculiarity lies in the fact that people can interact with it, recognize appreciation and participate in the completion of work and other targeted artistic purposes, which gives a deeper meaning and significance to the work.
-**Time and space** Unlike traditional works, visitors can interact with the work in changing forms according to the possibilities presented by the work, and therefore the work will also undergo certain changes due to the "mode" of the environment and changes in time, and thus the emergence of different types of artistic experience.

Second: Design Stage:

- **Second interview**: **Designing vocabulary, engineering abstract elements and the role of computer programs:**
- **Objectives of the interviews:**

-Introduce students to geometric and organic units and how to formulate them abstractly.

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-Focusing on the importance of the laws of proportionality, superposition, equilibrium and correspondence in the distribution of units.

-Emphasizing the diversity in the choice of colors and the multiplicity of color tones for one color.

- **Conduct of interviews:**

-Students are introduced to some units (geometric - organic - line shapes) that have a visual meaning.
-The importance of recognizing the relationships between shapes in the distribution of abstract units on design bases and the extent to which they can be organized within various combinations and formations and the production of infinite formulas characterized by balance and harmony, which depend on repetition, superposition, seam, balance and exchange between shapes and the floor.
-Designs are made using the digital program Corel draw to prepare a sculptural design in more than one form for one work.
-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.

The digital software used in the experiment:

Corel Draw is one of the most popular programs of the Canadian company Corel , used to set up Vector designs and EPS graphics ،It is used by illustrators, designers and web developers, and it has a set of drawing tools, and the image can be resized repeatedly, and the images resulting from the design on it are of a small size compared to the size of the designs resulting from other programs, and the program supports 17 languages, the most important of which are Arabic, Asian languages and English

Third: Experimentation Phase:

- **Third interview**: **Stereoscopic formation and different manual animation methods for one work:**
- **Interview Objectives :**

-Identify the properties of MDF wood used in the forming process.
-Enumerates the methods of cutting wood and the tools used.
-He tries 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 cutting and how to install and build to the appropriate shape.
- Practice how wooden units are superimposed, and a good and consistent installation of the required design.

Fourth: Implementation Phase:

- **From the fourth interview to the sixth interview: Production of an interactive wooden three-dimensional sculpture**:
- **Objectives of the interviews:**

- Appreciate the value of the output of sculptural work to the fullest and extreme precision.
- He feels the importance of dynamism in interactive sculptural work.
- He takes care of contemporary sculptural work and feels continuous and experimented with.

- **Conduct of interviews:**

- Students start by cutting wood and smoothing the pieces with sandpaper.
- Students implement a design on the Corel Drow program whose elements are abstract in an area ranging from 50 to 70 cm in dimensions.

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- 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 wooden units to obtain the best interactive sculptural composition.
- The works are discussed at the end of the last lecture and the sculptural works are prepared and directed for the exhibition.

- **Unit Calendar:**

The interview is evaluated according to the objectives achieved, and the works are also judged by specialized professors.

From this point of view, the researcher believes that experimentation is not a matter of appearance, but it is the objective means to detect 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 (wood ore) and reveal 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 studying interactive sculptural works 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, interactive sculptural works urge the viewer to interact with them and know their goal, the main task of the artist is to deliver his message to the viewer and connoisseur in the best appropriate ways, the research dealt with how to benefit from the element of movement in the production of interactive sculptural works.

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 moderates the discussion with his students on the extent to which the dynamic movement is benefited and its relationship to the perception of the contemporary interactive sculptural form in the light of the concept of geometric abstract art in sculpture, the effects of the material used (MDF wood), and the most important methods of installation and installation, with emphasis on the pros and cons of formation for each sculptural work and pictures from (7: 82) The research experience is presented to third-level students, Department of Art Education, Faculty of Specific Education, Matrouh University, for the academic year 2023/2024.

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Research Experience
For students of the third level, Department of Art Education, Faculty of Specific Education - Matrouh University
Models for some stages of business design using (Corel Dro - 3D Auto desk Maya), and the implementation of artwork for the search experiment - Figures (7-82)
First action:

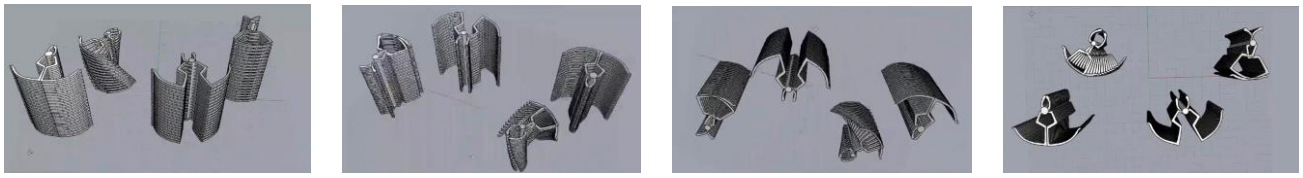

Figure (7) First Work Design Applications

Figure (8) Variable (a) First work

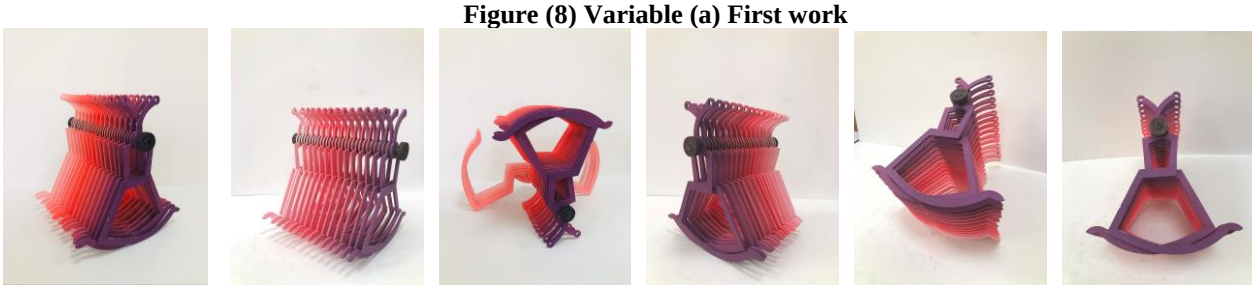

Figure (9) Different viewing angles Variable (A)

Figure (10) Variable (B)

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Figure (11) Different viewing angles of variable (B)

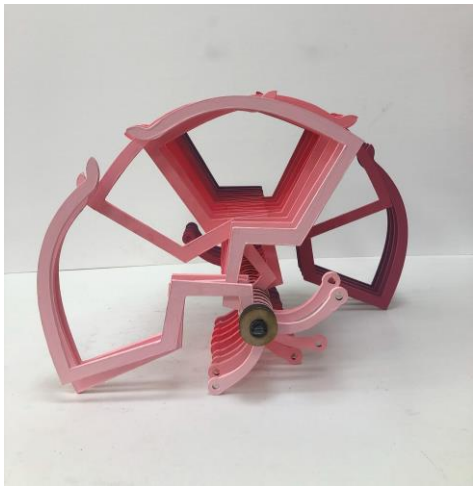

Figure (12) Variable (C)

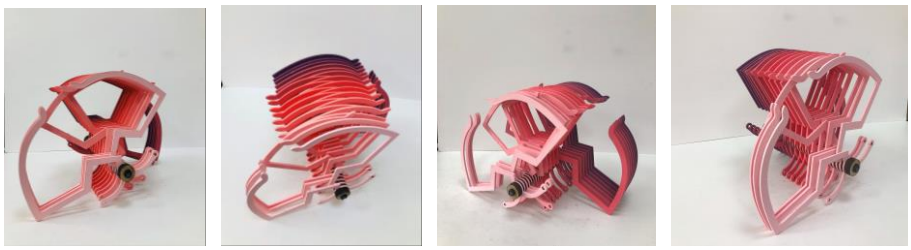

Figure (13) Different viewing angles variable (c)

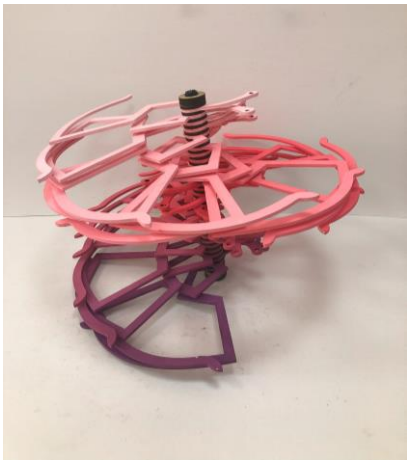

Figure (14) Variable (D)

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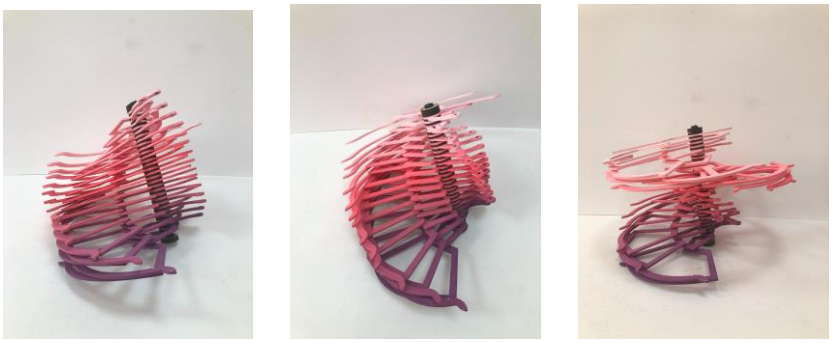

Figure (15) Different viewing angles variable (d)

Second work:

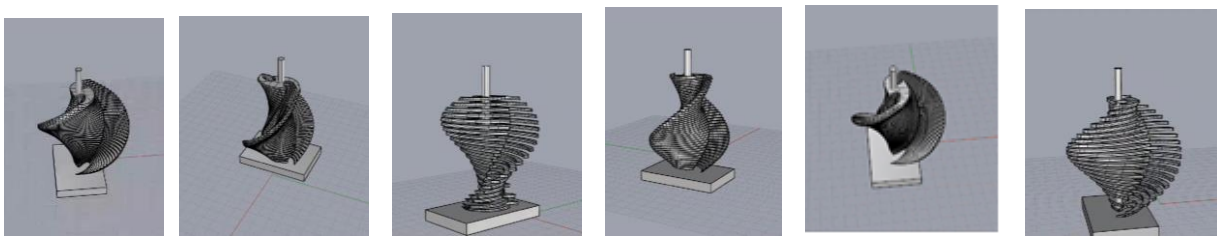

Figure (16) Second Work Design Applications

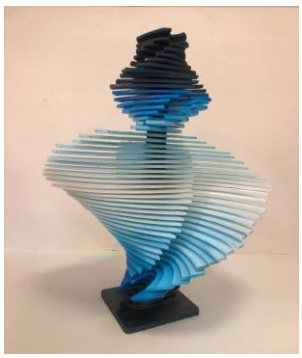

Figure (17) Variable (A) Second Work

Figure (18) Different viewing angles Variable (A)

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Figure (19) Variable (B)

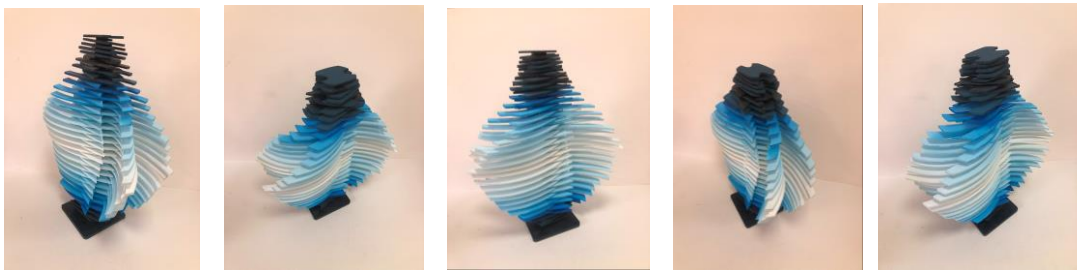

Figure (20) Different viewing angles variable (b)

Third work:

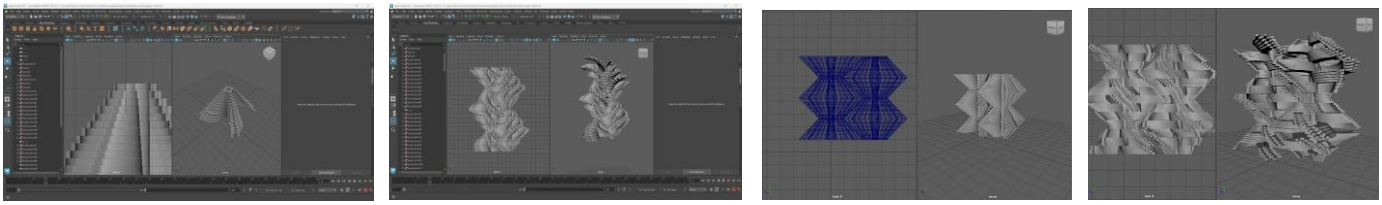

Figure (21) Third Work Design Applications

Figure (22) Variable (A) Third Work

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Figure (23) Different viewing angles Variable No. (A)

Figure (24) variable (b) and different viewing angles for it

Figure (25) variable (c) and different viewing angles for it

Figure (26) variable (d) and different viewing angles for it

Figure (27) variable (e) and different viewing angles for it

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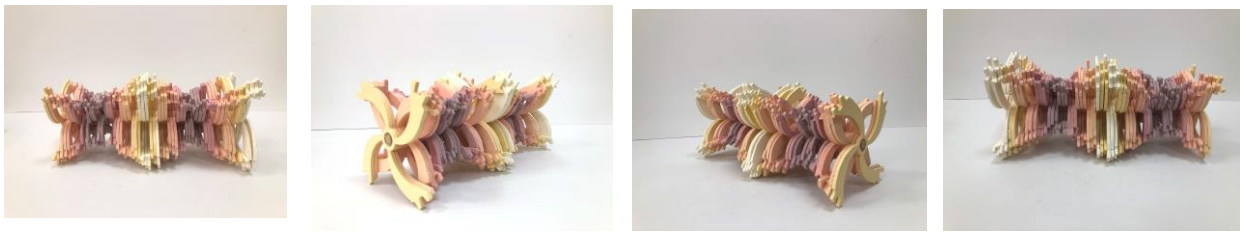

Figure (28) variable (f) and different viewing angles for it

Fourth work:

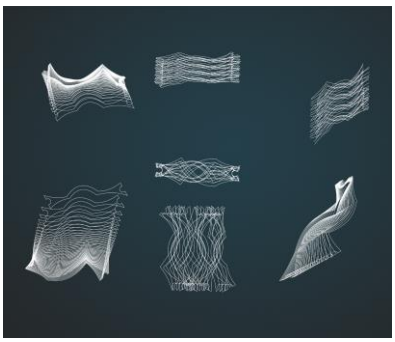

Figure (29) Fourth Work Design Applications

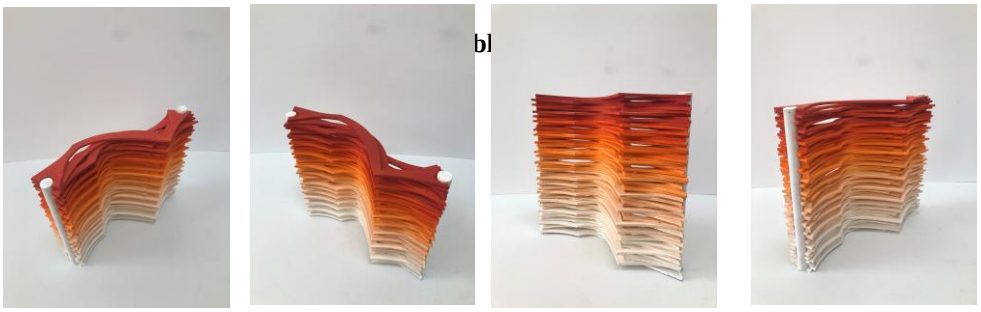

Figure (31) Different viewing angles variable (A)

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Figure (32) Variable (B)

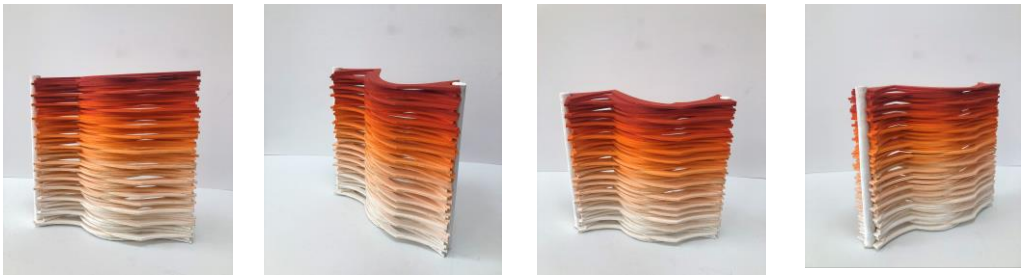

Figure (33) Different viewing angles variable (b)

Figure (34) Variable (C)

Figure (35) Different viewing angles variable (c)

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Fifth work:

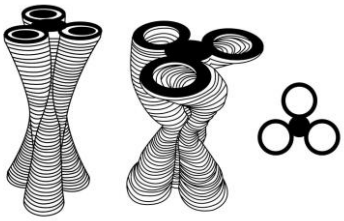

Figure (36) Fifth Work Design Applications

Figure (37) Variable No. (A) Fifth Work

Figure (38) Different viewing angles Variable (A)

Figure (39) Variable (B)

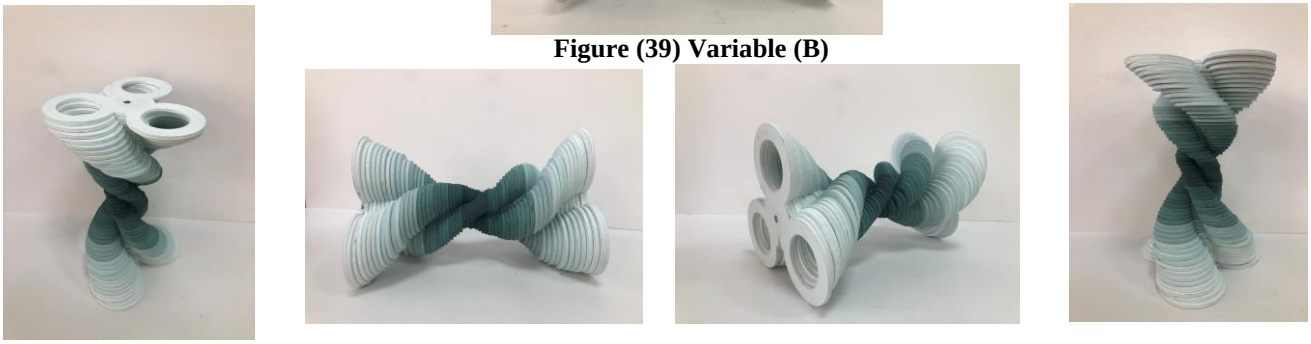

Figure (40) Different viewing angles variable (b)

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Figure (41) Variable (C)

Figure (42) Different viewing angles variable (c)

Sixth action:

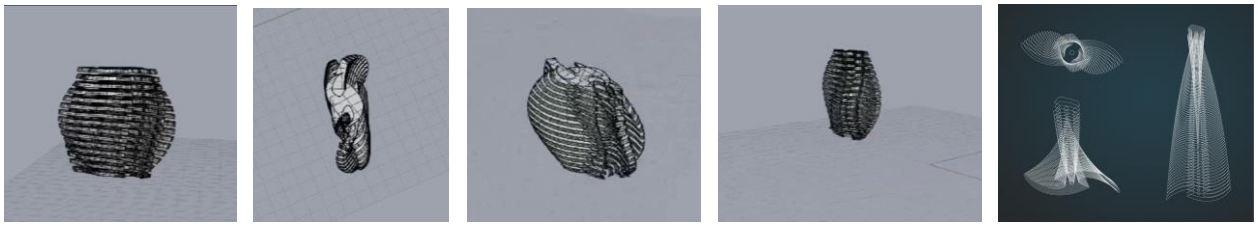

Figure (43) Applications of the design of the sixth work

Figure (44) Variable No. (A) Sixth Work

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Figure (45) Different viewing angles variable (A)

Figure (46) Variable (B)

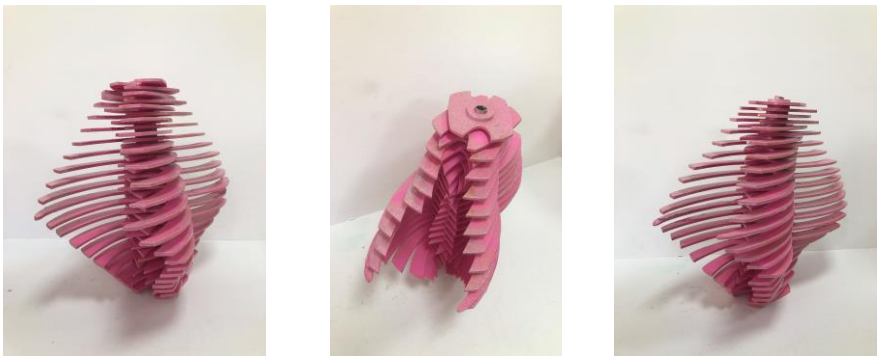

Figure (47) Different viewing angles variable (b)

Figure (48) Variable (C)

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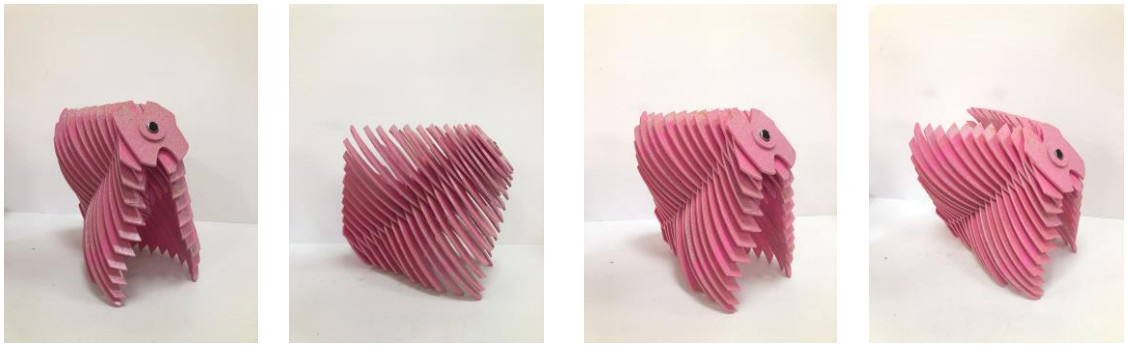

Figure (49) Different viewing angles variable (c)

Figure (50) Variable (D)

Figure (51) Different viewing angles for variable (d)

Figure (52) Variable (E)

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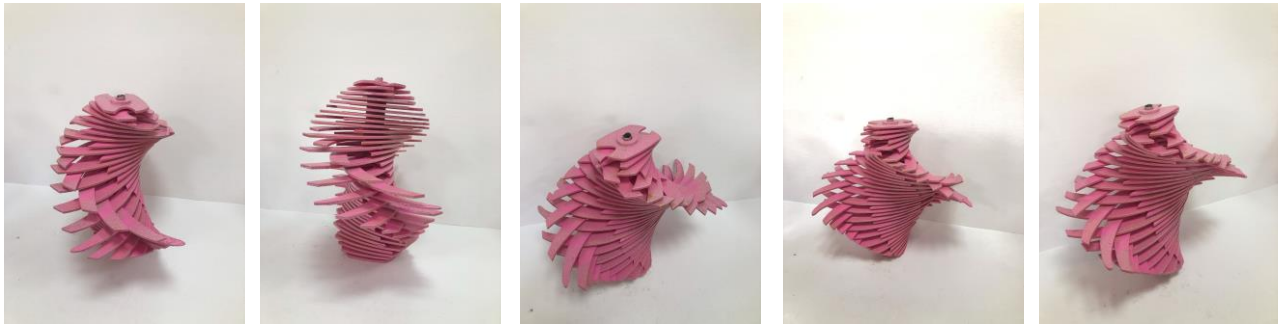

Figure (53) Different viewing angles variable (e)

Seventh action:

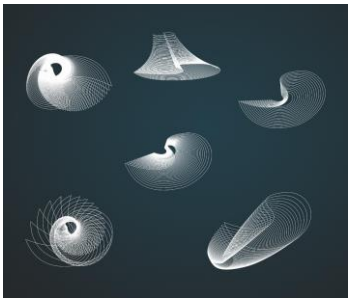

Figure (54) Applications of the design of the seventh work

Figure (55) Variable (A) Seventh Work

Figure (56) Different viewing angles variable (a)

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Figure (57) Variable (B)

Figure (58) Different viewing angles to visualize No. (B)

Eighth action:

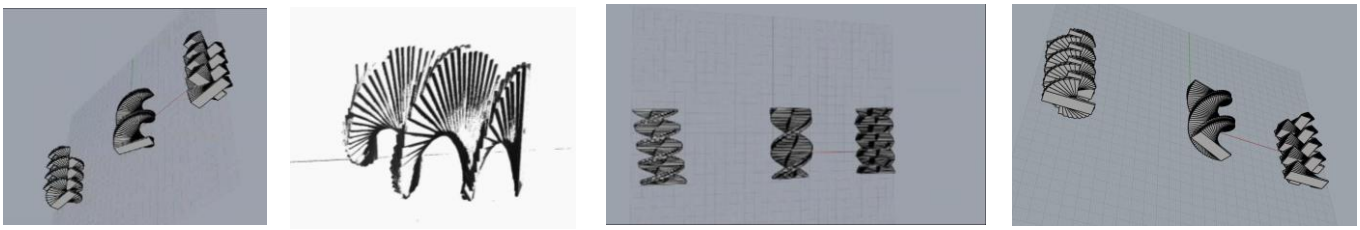

Figure (59) Applications of the design of the eighth work

Figure (60) Variable (A) Eighth Work

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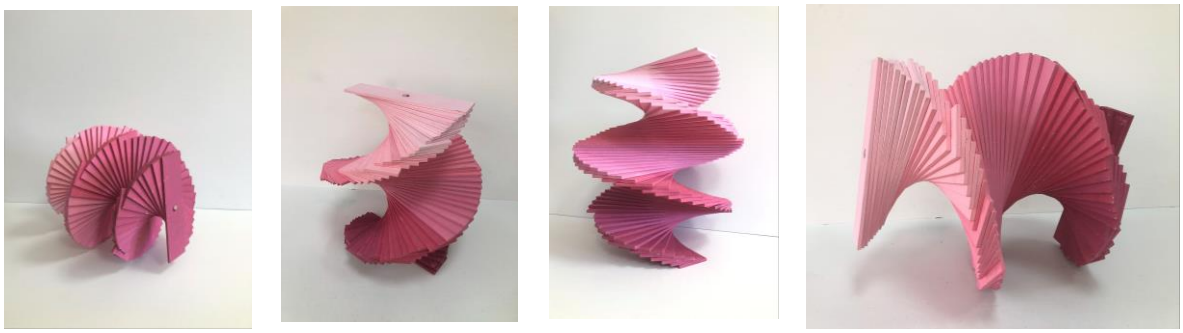

Figure (61) Different viewing angles variable (A)

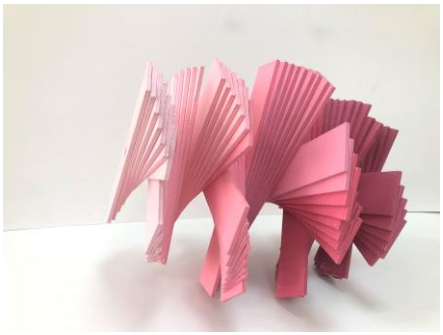

Figure (62) Variable (B)

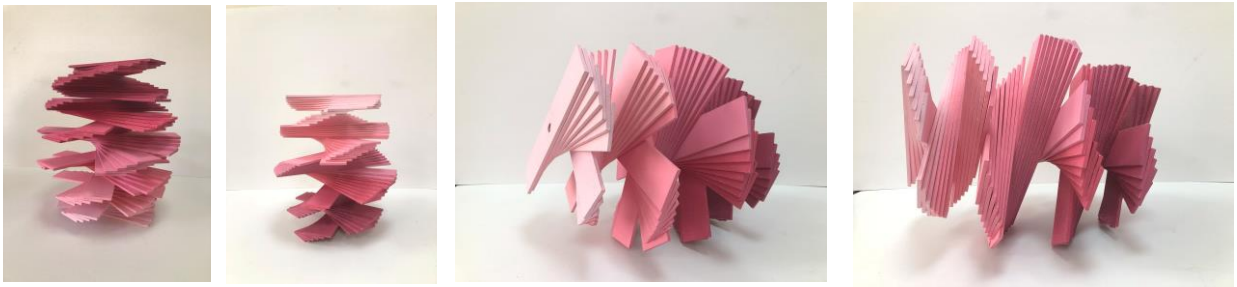

Figure (63) Different Viewing Angles Variable (B)

Ninth action:

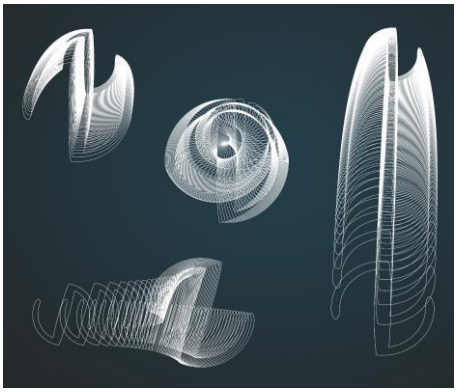

Figure (64) Applications of the design of the ninth work

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Figure (65) Variable (A) Eighth Work

Figure (66) Different viewing angles Variable (A)

Figure (67) Variable (B)

Figure (68) Different viewing angles variable (b)

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Figure (69) Variable (C)

Figure (70) Different viewing angles variable (c)

Tenth Action:

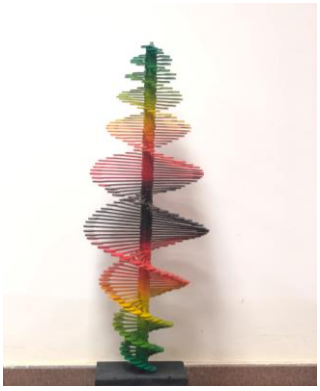

Figure (71) Variable (A) Ninth Work

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Figure (72) Different viewing angles variable (a)

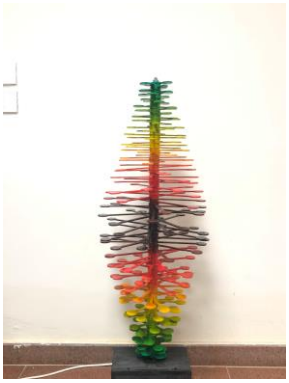

Figure (73) Variable (B)

شكل (74) زوايا رؤية مختلفه متغير (ب)

Figure (75) Variable (C)

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Figure (76) Different viewing angles variable (c)

Twenty-first work:

Figure (77) Variable (A) Work X

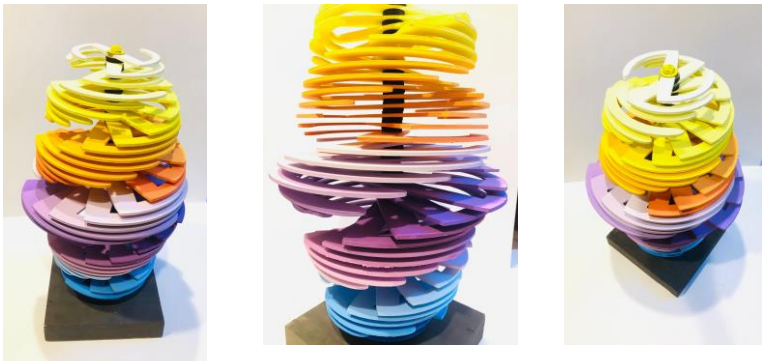

Figure (78) Different viewing angles variable (A)

Figure (79) Variable (B) Work X

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Figure (80) Different viewing angles variable (b)

Figure (81) Variable (C) Work X

Figure (82) Different viewing angles variable (c)

The output of practical applications illustrates the interaction of the viewer with the work by changing the positions by hand

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- 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. Vision dynamics can be achieved through the use of the concept of movement in the construction of the interactive holoscope.
2. The use of colors by some artists to give aesthetic value to the sculptural work.
3. The movement of a work of art does not depend on the position represented, but the work can have one or more movements.
4. There are many factors that control the viewer's perception of the artwork, some of which are related to the subject or work, and some of which are subjective related to the viewer, which changes with him the visual vision and artistic vision of the work.
5. Three-dimensional design software helps facilitate the process of designing interactive sculptural works.

-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. Focusing on the importance of movement and its implications in sculptural works through the establishment of scientific seminars centered on movement in sculpture.
2. Include in the vocabulary of sculpture course prescribed in the Department of Art Education topics on postmodern and contemporary arts in the field of interactive sculpture.
3. Conducting studies on how the viewer perceives the work of art and the need for the art practitioner to have sufficient information about perception in order to be able to communicate his artistic message.
4. Sculptors should be keen to include in their sculptural forms a kind of movement in order to become an artistic and emotional excitement for the viewer.
5. Conducting studies on the significance of movement in interactive sculpture.

6.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.

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