

**Weaving Diverse Designs of Cells Under the Microscope Using
Cardboard Loom to Produce Collage-Style Fabric
on Mannequin**

Nahla Ahmed Eldeeb

**Assistant Professor -Educational Art Department, Faculty of
Specific Education, Alexandria University**

Abstract:

The artist always strives to try to discover the components of nature that he deals with visually with the aim of employing their components in building and forming his artworks with his own vision as he was able to record images under the seabed, on the surface of the moon and from spaceships. Accurate cameras are now recording facts about nature above the level of the artist's ability. It has been recording facts about nature above the level of human ability, so that X-rays penetrated the outward to reveal the inner, and used magnifying lenses, microscopes, telescopes, etc., so there were several tools for seeing and studying nature that expanded the field of perception and revealed some invisible beings that are not even visible with the naked eye.

Tissues are a fertile source of inspiration for the artist including aesthetic images and endless bodies from which he selects his artistic themes and plastic vocabulary. The artist must invent his language and plastic element.

The current study depends on the formal, structural, and aesthetic values of the cells to create a new vision through the synthesis of thought and collage arts, and then inspiring a number (9) of innovative design ideas for implementation on the cardboard loom using some techniques, weaving methods and embroidery arts, and employing this technically and practically using the Photoshop system to make ideas that is moldable on the mannequin.

Keyword:

Cells under The Microscope - Collage - Cardboard Loom - Mannequin.

Introduction:

Research Background:

In the beginning of the second half of last century, and with the development of electron microscopes with huge magnification power, it was possible to identify the fine details of the external shape and internal components of living cells, and these discoveries led to a tremendous development in the field of biological and medical sciences and genetic engineering. With the influx of hundreds of microscopic images, it became clear that these images have enormous, distinct, and visually different aesthetic, formal, and color values, and with image analysis, the strong link between composition and functional performance became clear, without prejudice to aesthetic values. (Marwa, 2019, p.406)

Order is one of the properties of the universe, and the meditator of this system finds many mathematical and engineering relationships and various structures and many studies of aesthetics have dealt with the relationship of art to nature and touched on revealing the laws of nature and what they produce in terms of relationships, structures and systems of forms that guarantee aesthetic pleasure to the senses, and any scientific research on the development of the structure of organic or inorganic bodies leads to the emergence of many visible shapes and structures with an integrated pattern from the aesthetic point of view, not only on the visible forms from nature, but also applies to the particles that make up matter, as it happens in all components of living cells. (Duaa, 2008, p. 3)

The contemporary artist has made many experimental attempts to get out of the traditional framework of the weaving product while preserving the plastic technical assets of the weaving work and the general features that characterize this field from other fields and it was necessary for the artist to search for experimental approaches that would help him express and modernize freely and freely so that the artist would translate his feelings in an attempt to mix and combine traditional weaving materials with other non-traditional materials in artistic integration and unity.

Therefore, the current study turned to attempts to experiment with it to take advantage of the collage idea to make a set of decorative designs and synthesize weaving techniques to produce contemporary weaving works that can be formed on the mannequin using the Photoshop program.

Research Problem:

When the artist chooses an element, or a group of elements, whatever their source or form, to formulate a work of art through them, this necessarily requires him to prepare a method for arranging and organizing these elements within the framework of his artistic work, achieving distinction and uniqueness for him. This method, in which the artist seeks to collect and organize his elements to create a new structure for these elements, is called composition, and the compositions of artists vary according to their methods and style, and this always requires searching for multiple sources from which the weaving designer draws inspiration from designs that keep pace with modernity and functional purpose.

Therefore, using and seeing hundreds of electronic microscopic images of living organisms carries a lot of distinct aesthetic values that can be employed in the field of art education, through the following question:

How is it possible to combine the multiplicity of design visions of cells under the microscope and collage arts to produce weaving fabrics using the cardboard loom that can be formed on the mannequin?

Research Hypothesis:

The possibility of weaving designs from cells using a cardboard loom suitable for the production of weaving fabrics on the mannequin.

Research Objectives:

- Using the collage method to achieve a contemporary plastic vision for the formation of weaving fabrics.
- Finding intellectual design solutions inspired by images of multiple cells under the microscope and how to benefit from the art of collage to achieve aesthetic values to produce contemporary weaving fabrics.

Research Importance:

- A new vision to get the weaving work out of its traditional form using the collage method and then shaping it on the mannequin.
- Emphasis on the importance and the bond between science and art and the impact of each on the other.
- Offering non-traditional solutions for teaching applied fields such as the field of art education.

– Opening new horizons for experimentation in the field of teaching manual weaving as one of the important entrances to achieving innovative plastic values that help find new solutions and formulations.

Research Limitations:

The research is limited to the following:

- A proposed unit to teach the combination between multiple design visions of cells under the microscope and the arts of collage to produce weaving fabrics using the cardboard loom that can be formed on the mannequin.
- The practical application of experimentation is limited to the practical practices of a sample of second year students (Department of Fashion Design) - Faculty of Arts and Design - Pharos University in Alexandria - Fall 2021/2022.
- The idea of the experiment takes 10 weeks, with 5 actual hours per lecture = 3 credit hours.
- The use of cotton threads for warp, and for the weft, woolen and artificial silk threads of various sizes.
- Using needles for embroidery - crayons for coloring - Canson paper.
- The weave structures used are plain 1/1 and its extensions, some types of embroidery stitches (running-Caneva-, zigzag, ...).

Research Methodology:

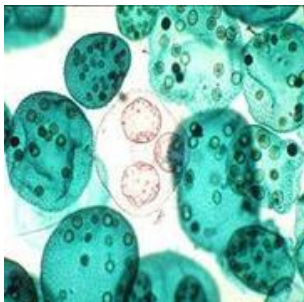
First: Theoretical framework: The researcher follows the descriptive analytical approach through:

1- Microscopic imaging of cells from the functional and technical perspective:

Cell science is a relatively new science that has witnessed great progress in recent decades due to the great discoveries in the field of molecular biology, which were made by examining cells with a light microscope. Most of these cells are small and their dimensions are measured in micrometers (a micron is one millionth of a meter = 1×10^{-6}), the cell was discovered in the 17th century with the invention of the optical microscope by the Dutch scientist Hoek Vanleevwen, which allowed the discovery of objects that could not be seen with the naked eye.

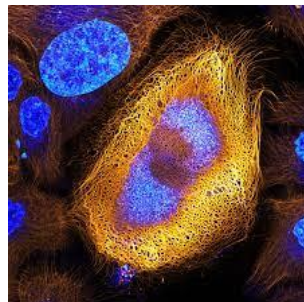
In the 19th century AD, scientists emphasized that the cell is the structural and functional unit of living organisms, whether human, plant, animal, or single-celled organisms. The cell performs all the vital functions necessary for its continuity, and with the beginning of the 20th century, with the development of the optical microscope and the increase in its magnification capacity to 1500 times the original size, scientists were able to know more about the apparent shape of the cells and to see some single-celled microorganisms such as bacteria. Scientists were able to learn more about cells and the variation in their shapes, structures, and functions. (Hazem, 2017, p.20)

In general, the use of the electron microscope in the biological and physical field led to progress in the medical and therapeutic fields and led to the development of genetic engineering techniques and cloning processes and the production of huge numbers of images that helped in understanding these tiny objects that carry high aesthetic values in shape, composition, colors, lines, geometries and symmetry The latest aesthetic values in an unprecedented manner which can represent a new source of nature from which the designer artist in all artistic fields can draw inspiration from unprecedented forms commensurate with the ideas of the era. (Marwa, 2017, p. 154)



Picture (1)

Human cell under microscope



Picture (2)

Human cell under microscope



Picture (3)

Human cell under microscope



Picture (4)

Plant cell under microscope



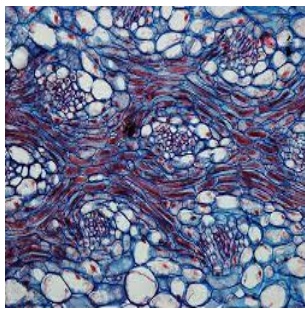
Picture (5)

Plant cell under microscope



Picture (6)

Plant cell under microscope



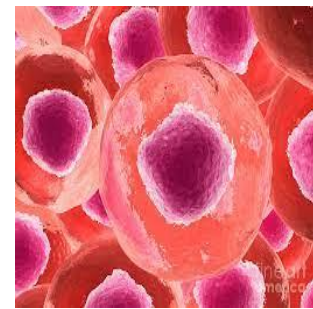
Picture (7)

Animal cell under microscope



Picture (8)

Animal cell under microscope



Picture (9)

Animal cell under microscope

2- Structural systems of cells and point and line values in design:

The artist resorts to nature as a rich dictionary of all elements and forms. The artist may resort to the simplest elements of nature to form his works, such as grains of sand, gravel, rocks, plant leaves, flowers, trees, fish, birds, or animals of all kinds and shapes or it may be the person himself, and from here we realize the infinite amount that nature provides us with innumerable shapes, images and elements, a fertile field in which there are many structural laws and systems that enable the artist to express new plastic visions and contemporary artistic ideas through the two elements of point and line. (Muhammad, 2001, p. 19)

The Structure System:

A. System: It is the total, organized or complex entity that includes a grouping of things or parts consisting of an integrated unit. It is the whole that is composed of a group of elements or parts that have functions, among which there are reciprocal relationships that take place within laws. (Ahmed,1998, p. 206)

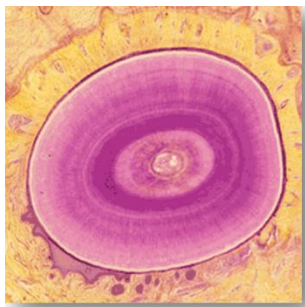
B. The form and the background: They are the basis of all composition and construction relationships in the formation or design, and we refer to them sometimes as the form is the positive element, and the background is the negative element. The form represents the basic element to be expressed, while the background represents the appropriate periphery that is commensurate with and confirms the form and the relations between the figure and the background vary, so they take different arrangements in which each of them exchanges according to the degree of importance that the artist gives, once to the figure and once to the background - and once to the two together, to the extent that the distinctive features of each of them are absent, and thus the design is characterized by integration.

C. Compatibility and contrast: Contrast is the opposite of compatibility. Compatibility means the situation in which two disparate things or things come together in a graduated way. If the compatibility is the transition, for example, between white and black through the different shades of gray that ranged between the two contrasting parties, which are white and black, the contrast means the use of contrasts side by side, so the faster the transition from the state of white to the state of black, that is closer to the state of contrast. Compatibility and opposition are two values that we can discover their presence in nature through some aspects such as night and day - long and short.... There is a gradation between these aspects, which gives the value of compatibility.

D. The systems or axes on which the design system is based:

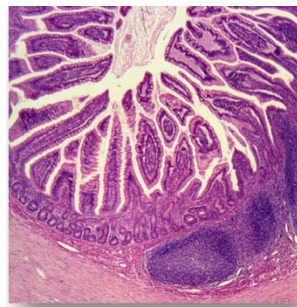
D-1 Radial System:

What is meant by the word “radiate” is the launch or start from a central point, and the radiation can be described as a special case of sub-formations, which revolve regularly around a specific center, so that this leads to the occurrence of systems of central radiative relationships (Wong, 1972, p. 40), the radiological formal relationships systems are characterized by the impulsive property, and it seems that the speed of these systems is constantly rising when tracking the change of shapes as they move from the inside to the outside. (Gotto, 1978, p. 185) The lines that radiate from a point or from an axial line are distinguished by their vitality, and that gathering point excites the artist to make it the center of design or the center of sovereignty, as all radial lines attract the eye to the center and the point of convergence attracts the eye, if the main shape is not placed in it, then two centers appear in the design that attract the eye to them, and this loses the design and its unity, and decreases its artistic and aesthetic value, so the design is distinguished by a huge kinetic force, as the spread or radiation in itself is considered a movement characterized by speed with all kinds of lines (Muhyiddin, 1998, p.60)



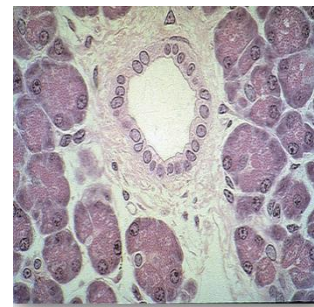
Picture (10)

Cell under the microscope showing
the radial system



Picture (11)

Cell under the microscope showing
the radial system



Picture (12)

Cell under the microscope showing
the radial system

D-2 Parallel System:

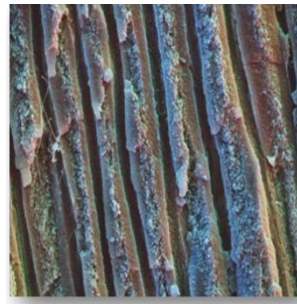
It is the arrangement of two elements in one plane, so they do not meet. These two elements can run parallel horizontally, vertically, or inclined, or take different and varied paths, with the possibility of changing and moving the distances between them.

The greater its potential kinetic strength, the more dynamic it becomes with the change of its rhythms. The thickness and the change in the directions of movement of the branching systems achieve a kind of gradation and contrast and make it more rhythmic with the change in the lengths of the parallel lines. The parallel system may take different positions such as the horizontal, vertical, and inclined position, thus achieving a kind of difference that makes this system more diverse and reduces its symmetry and repetition, which may sometimes lead to boredom and monotony. (Safaa, 2004, p.45)



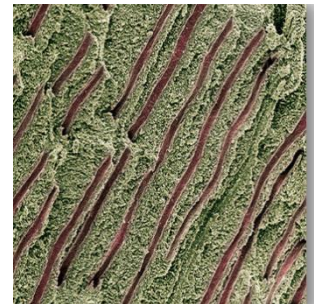
Picture (13)

Cell under the microscope showing
the parallel system



Picture (14)

Cell under the microscope showing
the parallel system

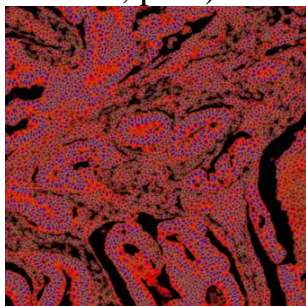


Picture (15)

Cell under the microscope showing
the parallel system

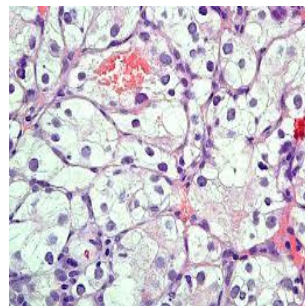
D-3 Demarcation System:

The demarcation is one of the most important assembly and linking systems, which is the system of combining and linking elements through their convergence at a point, or a line, it is considered a linear rhythm resulting from the difference in the length and thickness of the branches, in addition to the diversity in its linear pattern. The lines may be straight, wavy, curved, or other types of lines, which take several different paths, which results in various void spaces between closed and free spaces. This system connects linear ramifications, whether in one element or between ramifications of more than one element within the cell. (Ahmed, 2000, p.60)



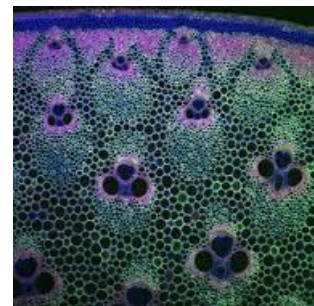
Picture (16)

Cell under the microscope showing the demarcation system



Picture (17)

Cell under the microscope showing the demarcation system

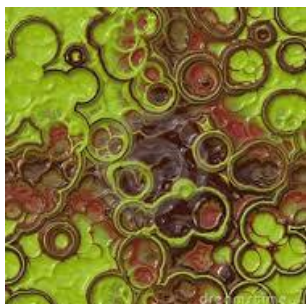


Picture (18)

Cell under the microscope showing the demarcation system

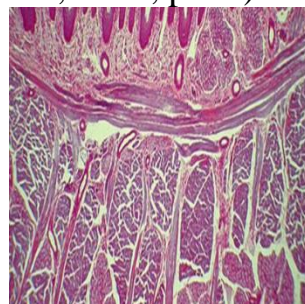
D-4 Imbricate & Inter Section System:

It is the containment of the elements to each other, and their interdependence to occupy the spatial spaces between them, or within them, with total or partial movements, and the points are cohesive, interdependent, and overlapping, generating kinetic energy, the intersection occurs if one line meets another line at any point, then the first line cuts the second line, and this is called the intersecting system, and if these lines are repeated in a complex manner, the interlocking lines are formed and differ in their directions, then the resulting shape is more complex and complex and resembles the web. (Rita, 1999, p. 82)



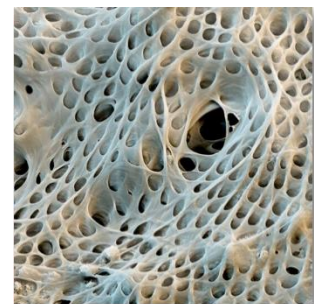
Picture (19)

Cell under the microscope showing the Imbricate & Inter Section System



Picture (20)

Cell under the microscope showing the Imbricate & Inter Section System



Picture (21)

Cell under the microscope showing the Imbricate & Inter Section System

D-5 Spiral & Helix System

Spiral System: This system arises from the continuous rotation of a curved line in a circular direction with a developing upward movement until it closes on itself. As for the spiral system: it is more dynamic than the spiral system and varies according to the diameter of the circles and the distance between them, and its dynamism increases whenever its thickness or the rate of its vertical rotation changes.



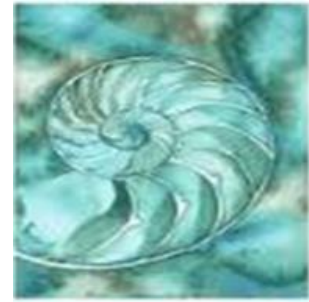
Picture (22)

Cell under the microscope showing the Spiral & Helix System



Picture (23)

Cell under the microscope showing the Spiral & Helix System



Picture (24)

Cell under the microscope showing the Spiral & Helix System

3- Kinetic and rhythmic values of the structural systems of cells:

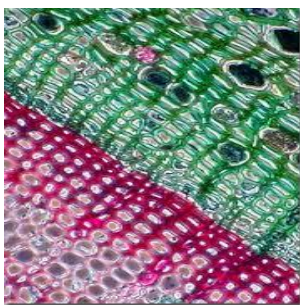
Kinetic values arise as a result of the point or line element starting from the center of a card, so they take their path in a specific direction according to what is required by the plastic formulations of the artwork. Therefore, the point is the simplest element that can be included in any composition, and wherever it is, it only expresses a mere spatial determination. Despite this, it evokes in the viewer a sense of its inclination to move, and this is something that would evoke kinetic activity that is not limited to the place where the point occurs, but rather extends to the surrounding space. A simple line is nothing more than a series of contiguous points defining a dimension and a direction, but it is filled with energy and potential kinetic forces that run in this direction, and gather at the two ends of the line, whether it is straight, curved, or wavy.

There are two types of movement: Static movement: It is the movement that characterizes the structural system of the point and line in the horizontal position only, and takes the direction of their movement to the right or to the left, and Dynamic Movement: It is the movement that characterizes the point and line structural system in the vertical position, from bottom to top and vice versa, or in its inclined position, from the inside to the outside and back, and each of them has a formative value that combines with each other and interacts, to enrich the artwork.

Rhythm is the law that regulates the movement of the point and the line and its continuity. It also combines stillness and movement, change and constancy and in its many forms is a term that means repeating the movement on a regular basis that combines unity and change, so the rhythm suggests the periodic law of the aspects of life and the realization of the features of these rotating frequencies or its signs gives the individual the feeling of the necessity of the availability of a law for any organized intellectual chain that gives it confirmation, sobriety and poise.

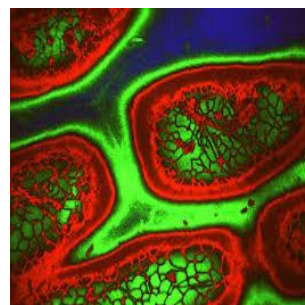
Rhythm is an organization of shapes and breaks between the units of the artwork, and these breaks may be between points, lines, spaces, shapes, colors, to arrange their degrees, organizing the direction of the elements of the artwork, and it is also characterized by continuity to achieve balance and unity in design, The formal rhythm is closely linked to the various forms of lines and the process of organization and diversity, whether in form or in order. Rhythm is also divided into several types: the regular rhythm, which is the result of the repetition of the structural systems of the point and the line that are similar in their properties, whether in the form of the point, its area, its direction, with the stability of this repetition at equal intervals, the increasing rhythm.

It is the result of the gradual increase in changing the properties of the point and line systems, with the stability of the periods or vice versa, or it results from the increase in both the changing of the periods and the properties gradually, The decreasing rhythm is the result of the gradual decrease in the properties of the systems, with the stability of the periods between them or vice versa, or it results from the decrease of both the gradual change of properties and periods. Free Rhythm It depends on the repetition of the rhythms, but with a complete difference in characteristics and periods. It was also arranged in proportion and balance, which is the true expression of movement and balance.



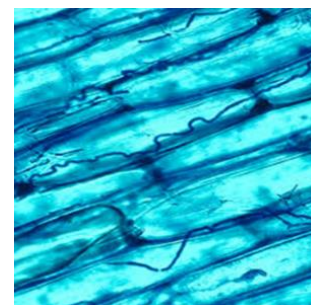
Picture (25)

Static movement of the point and line



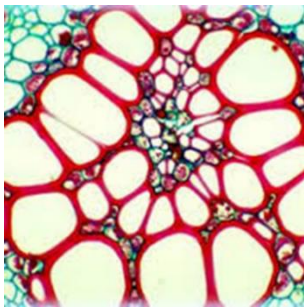
Picture (26)

Static movement of the point and line



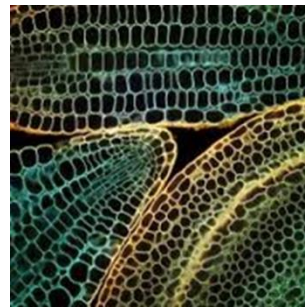
Picture (27)

Static movement of the point and line



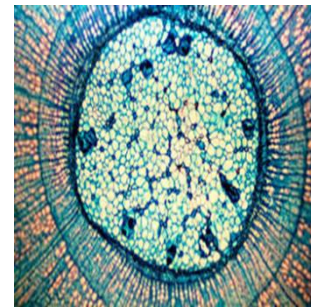
Picture (28)

Dynamic movement of point and line



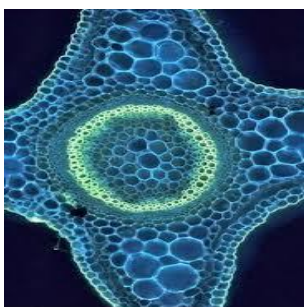
Picture (29)

Dynamic movement of point and line



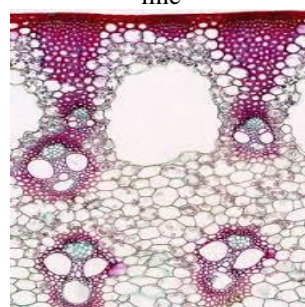
Picture (30)

Dynamic movement of point and line



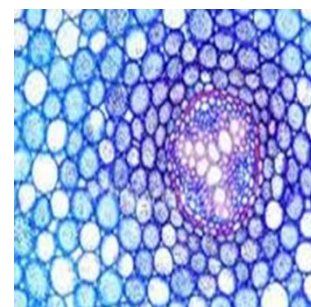
Picture (31)

Rhythm for point and line



Picture (32)

Rhythm for point and line



Picture (33)

Rhythm for point and line

Pictures (25): (33) The kinetic and rhythmic values of the structural systems of cells

4- Synthesis and collage arts:

The word synthesis is used in modern arts, and it means reconciling more than one raw material in a single artwork so that the combined raw materials enrich the same artwork. (Nabil, 1971, p.1) The method of synthesis was used for the first time with the Cubism school, through paper affixed to the surface of the painting of Braque, Picasso, and other pioneers of Cubism. When they used scraps of newspaper paper, wood veneer, and other materials that are characterized by touching different surfaces, this is only evidence of the use of more than one raw material in building a single artwork. And the method called Collage became widespread for several years and began to grow steadily until it became treated as surfaces, some of which stand out from others. (Mahmoud, 1981, p.71) John Golding indicated that the artist Picasso is the discoverer of the art of collage by adding new materials that may be for the purpose of highlighting the real texture, for example, and thus Picasso added new materials other than those used by Georges Braque, which is paper collage (John, 1983, p.61)

As for collage in the field of textiles, it is a method of adding raw materials or elements that fall within the total unit of textile artifacts and have a clear effect on it, through the distribution of textile and non-textile materials on the surface of the textile, and then completing the textile artifact after that by making areas of simple textile structures with other non-traditional and familiar materials in fabric. (Morton, 1975, p. 13) The importance of the collage is determined by considerations related to the selection of materials and formed elements, in addition to the organized and specific relationships and processes of these choices on the surface of the painting, as a means of expressing an endless number of ideas and contents, whether subjective, political, cultural, social or ...

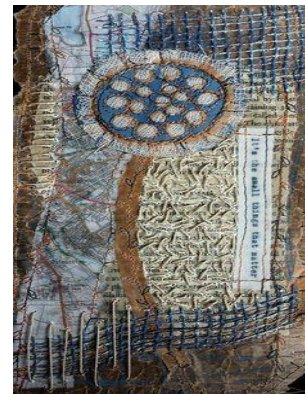
The nature of these materials and objects and their expressive values as basic visual components for producing any collage work constitute sources of inspiration for many works of modern art. Indeed, paper (newspaper paper - sandpaper - greeting cards - invoices - advertisements...) is the most common, as the plastic and tactile properties of paper have many solutions in collage work, as it can be crumpled, folded, bent, wrinkled, in addition to the possibility of rolling it to make figures (Dian, 2007, p. 24)



Picture (34)
Weaving art collage



Picture (35)
Weaving art collage



Picture (36)
Weaving art collage

5- Cardboard loom and partial sealing capabilities:

The warp is the process of winding the warp on a cylinder so that they are parallel and equal in length. The warp is considered an essential element in the weaving structure, and its function is not limited to interlocking with the weft to form the weaving surface, but it participates in enriching the surface of the woven in some techniques such as the warp and reticule files. There are different methods of partial sealing in multiple directions, including: (Hiam, 2003, p.46)

A. Warping in the horizontal and vertical directions: in which the warp threads are warped in the form of two groups, one of which is tensioned vertically and the other is tensioned horizontally, after dividing the area of the loom into two equal areas, each of which represents a triangle.

B. Warping with struts: The use of warping with struts provides an opportunity to tighten the warp threads in more than one direction as well as obtaining more than one level, as the warp threads are divided into two groups, one of which is tensioned vertically and the other is tensioned horizontally using a support in the form of a curved line to tension the threads in the horizontal direction.

C. Warping in an oblique direction: It is done by pulling the warp threads in an oblique direction at regular or irregular distances, and a group of warp threads is pulled in an oblique direction, with another group being pulled in the opposite direction. As a result, the warp threads of the two groups intersect, and the geometric voids confined between the warp threads vary, and these spaces range from the smallest to the largest.

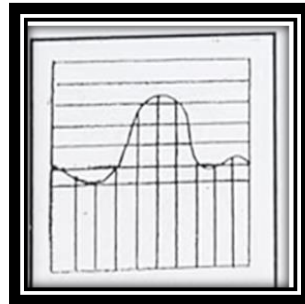
D. Warping from a center: In this method, the warp threads are tightened around a loop, which is the center of the threads emanating inside a frame whose geometric shape change, and the distance between the threads is regular or irregular, and the distances between the warp threads are close at the ring, and the distances gradually diverge between the threads as they move towards the inclination of the circumference of the loom.

E. Warping from two centers: It is done by selecting two centers, from each center of which the warp threads are pulled in the form of rays representing the shape of a triangle.

F. Warping from more than one center: To obtain this method, the perforation warping method can be used, where points are pierced to tighten the warp threads, including the warp threads, as if they are connected to each other, forming a network of threads.



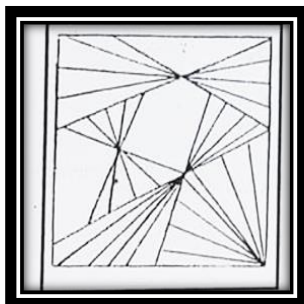
Picture (37)
Warping in an oblique direction



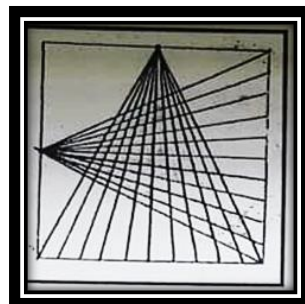
Picture (38)
Warping with struts



Picture (39)
Warping in the horizontal and vertical directions



Picture (40)
Warping from more than one center



Picture (41)
Warping from two centers

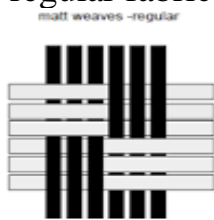


Picture (42)
Warping from a center

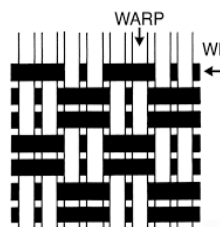
6- Plastic possibilities of plain weave:

The plain weave is the simplest type of fabric in which the weft thread intertwines with the warp thread so that each weft thread passes over one of the warp threads and under the next warp thread and reverses this arrangement with the next weft threads where the warp threads that were at the bottom of the previous weft thread are raised and the warp threads that were at the top of the previous weft thread go down, and this pattern remains until the width of the entire fabric or the part that contains a plain weave.

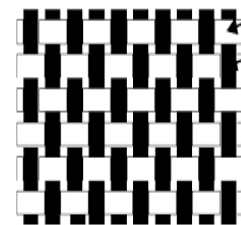
It has many plastic possibilities produced through the wefts extending in the width of the woven, if the weft extends from the right purslane to the left purslane, where the wefts alternate in colors using two different colors to give color effects on the surface of the weaving work, which are longitudinal pens, these longitudinal pens alternate as a shape and its ground, so we see the woven pens one time is the shape and the other is the ground, and here the woven color effects create a reciprocal relationship between the shape and the ground in the weaving work. The plain 1/1 fabric is also distinguished by its cohesion and stability, because each thread in it gives the maximum amount of interlocking to the adjacent threads, and thus produces a fabric that is more integrated than any other regular fabric.



Picture (43)
Plain weave 3/3



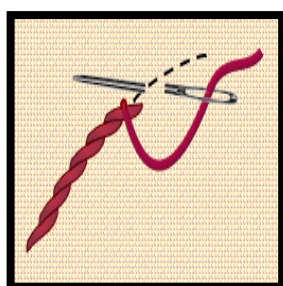
Picture (44)
Plain weave 2/2



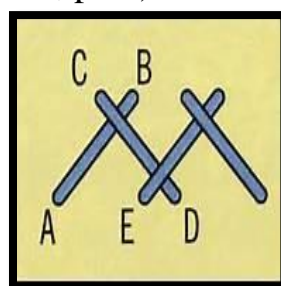
Picture (45)
Plain weave 1/1

7. Embroidery Methods:

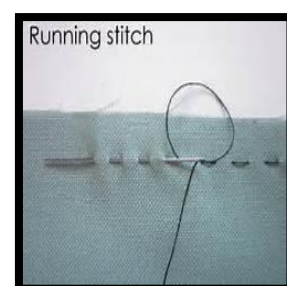
The art of embroidery is considered one of the first delicate handmade arts known to man since ancient times. It is one of the main sources for giving different effects and textures to the surface of the weaving using decorative stitches and different threads. Therefore, it is an art attached to the textile industry. (Basma, 2014, p. 2) It is the decoration of the fabric after it is woven by special embroidery needles using threads of different types and colors. (Soraya, 2002, p.2) It is the decoration of the cloth after it is woven with a special needle that varies according to the type of cloth and the stitches in thickness, length, and size with colored, regular, or metallic threads. (Suad, 1977, p.21)



Picture (46)
Embroidery Methods



Picture (47)
Embroidery Methods



Picture (48)
Embroidery Methods

Second: the practical framework: the researcher follows the experimental approach through several practical applications:

- **Unit title:** Weaving Diverse Designs of Cells Under the Microscope Using Cardboard Loom to Produce Collage-Style Fabric on Mannequin.
- **Unit Field:** Handmade Textiles.
- **Basic concepts of the unit:** Cells under The Microscope - Collage - Cardboard Loom - Mannequin.
- **Unit time:** 10 lectures of 5 hours per lecture, with a total of 50 teaching hours.
- **The target sample:** students of the second year (Department of Fashion Design) - Faculty of Arts and Design - Pharos University in Alexandria - Fall 2021/2022, through Textile Structures-FD 362.
- **Materials and tools:** several needles - scissors - a cutter - Canson 300 gm - colored quill pens - cotton threads for warp, and different types of wool and artificial silk threads for the weft.
- **Evaluation:** Initial evaluation after each lecture, final evaluation after the end of the teaching unit.

A table showing how the teaching unit works

These stages play reciprocal roles that influence each other through feedback

No.	Stages of the teaching unit progression		No. of lectures	Hours
1	Idea and Introduction	<ul style="list-style-type: none"> – Synthesis – Types of cells under the microscope: – Cells (human, animal, plant) – The structural system: <ol style="list-style-type: none"> 1. The system. 2. Figure and background 3. Compatibility and contrast. 4. The axes on which the design system is based. 5. Design and engineering networks. – Draw the required cell accurately with a pencil, then ink it with black ink. 	1 st	5
2	Design and collage	<ul style="list-style-type: none"> – Kinetic values of point and line structural systems. – The rhythmic values of the structural systems of point and line. – Enlarge the design by scaling in size. – Paper collage. 	2 nd 3 rd 4 th	15

		<ul style="list-style-type: none"> – Color - Color the painting with colored inking pens. 		
3	Execution and weaving on the cardboard loom	<p>Follow up on the actual implementation, output of the artwork, and evaluation of the students through:</p> <ul style="list-style-type: none"> – Print the painting on Canson. – Cardboard loom and its uses Plastic warping directions – Warping (in the horizontal and vertical directions - with supports - in an inclined direction - from one center - from two centers) – Making samples of the textile structures on the cardboard loom. – Plastic formations of plain weave. – Embroidery methods. 	5 th 6 th 7 th 8 th	20
4	A vision of formation on the mannequin through Photoshop	<ul style="list-style-type: none"> – The artistic and plastic values of the hanging tapestry using the Photoshop program. 	9 th 10 th	10
5	Total		10	50

Procedural objectives of the unit: The researcher identified the procedural objectives for teaching the proposed unit as follows:

The student should be able to:

Information and concepts:

- Mention the different engineering tools and the function of each of them.
- Explains the most important design elements and components.
- Lists the primary and secondary colors on the color wheel.
- Knows the types of plain weave structures 1/1 and its extensions.
- Distinguish between the types of kinetic values of the point and line structural systems of cells to make a special combination of histological design.

Mental skills:

- Differentiate between geometric and organic shapes in cell analysis.
- He estimates the difficulties and problems that he encounters while designing the artwork.
- It prefers to combine more than one weaving structure.
- It reveals the relationship between the main elements used in the artwork (material - color - technique).
- Organizes the relationship between weaving structures and color effects and employs them through plastic elements of design.

Professional skills:

- Selects a range of artistic designs by combining geometric and organic botanical shapes in cell analysis.
- Selects several methods of experimentation and multiplicity of the color effect on the weaving structures.
- Experiments with a range of exercises to emphasize the diversity of point, line, space, and texture as plastic elements for the canvas of his textiles.
- Discovers a set of structural relationships such as (addition or subtraction) - (Zoom in or out) - (demarcation or imbricate) to create a hanging textile.
- Connects regular geometric shapes into a group of smaller shapes.

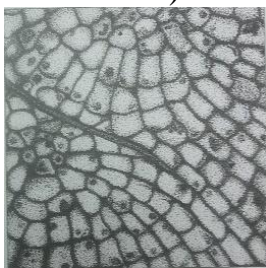
General skills:

- Considers the environment of the decorative artwork as a creative artwork.
- Evaluates risks and works under pressure to solve technical problems and obstacles encountered during weaving work.
- Uses modern technologies from internet sites to know what is new in the field of weaving design.
- Proposes alternative solutions in the light of a set of foundations and technical criteria.

Teaching Content:

The first stage: Idea and Introduction:

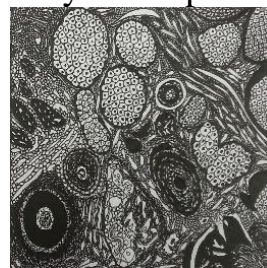
- Asking some questions about the business idea to draw the attention of the students.
- Explanation of the idea in defining the meaning of the system and the axes upon which the design system is based.
- Clarifying the difference between the five systems in choosing the design between the (radial-parallel-contiguous-interlocking-helical) system.
- Explain the design basis for each system with illustration with microscopic images to understand the difference between the types of cell systems.
- Displaying videos, links, and keywords as search engines, and you can use Pinterest:
 1. Microscopic art forms in the human cell
 2. Microscopic art forms in the plant cell
 3. Microscopic art forms in the animal cell
- Create a folder for each cell and start choosing 3 ideas for 3 different systems and start drawing and analyzing them with inking.
- Draw the required cell accurately with a pencil in a square area of 10 cm, then inking it with black ink through dotting and gradient from light to dark, and the line through the inclination of the lines, whether the lines are horizontal or vertical, and slanted to the right or left.
- Use the black ink pen in the analysis sizes (0.2- 0.4- 0.6-0.8- 0.10) to obtain the thickness and variety of the point and line.



Picture (49)



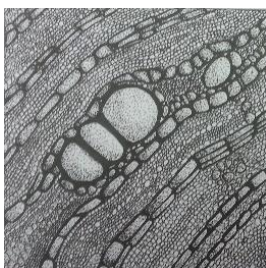
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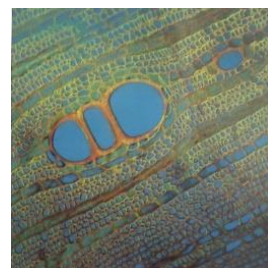
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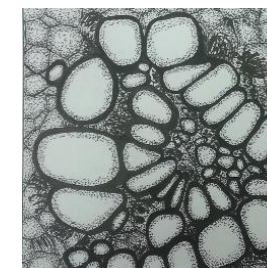
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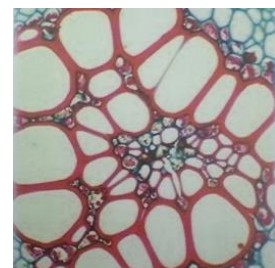
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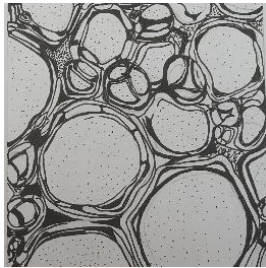
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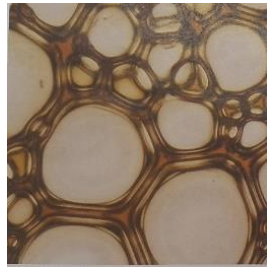
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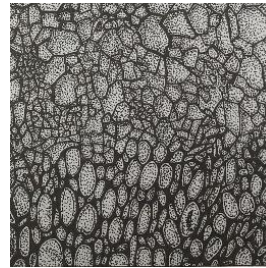
Picture (56)



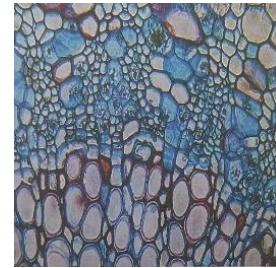
Picture (57)



Picture (58)



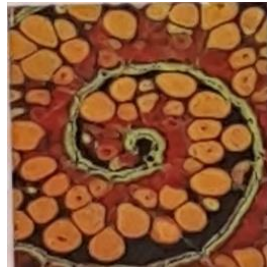
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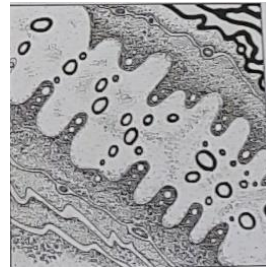
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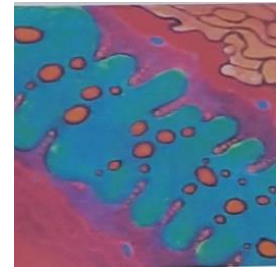
Picture (61)



Picture (62)



Picture (63)



Picture (64)

Pictures (49): (64)

The first stage: selecting the cell and drawing it in black ink through the point and the line

The second stage: Design and Collage:

– Only one design is selected out of three cells analyzed in black and white.

– Enlarge the design by scaling in size:

The first size: the original size is a square with a side length of 10 cm - it is photocopied 4 times on A4 paper.

The second size: a square whose sides are $2 \times 10 = 20$ cm - photocopied 3 times on A4 paper.

The third size: a square whose side length is $3 \times 10 = 30$ cm - to be photographed twice on civil paper.

Note: It is possible to increase the number of shooting times when needed within the design, each according to his idea.

– The resulting shapes are cut on the edges with sharp scissors, as well as cutting through adding or subtracting, and the use of the stencil feature, if any, and the presence of aesthetic spaces.

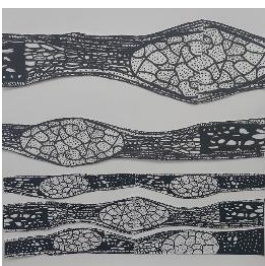
– The area of the square is 40×40 cm, and it is bordered by 5 cm spacers on all sides, so that the total area of the square is 50×50 cm, on a stretched white Canson.

– The illustrated shapes are distributed accurately, and the differentiation between the shapes and choices is done. The plaster is pasted with a temporary adhesive until the final shape of the design is stabilized. Completion of cutting blanks and minute parts of the cells.

- To make a connection between the shapes, he uses two colors of colored felt-tip pens with chromatic contrast, or only one color with its brightness (three to five degrees is sufficient), or the use of cell colors, or the use of the word Design Seeds.
- Explanation of the kinetic values of the point and line structural systems and their types (static - dynamic).
- Explanation of the rhythmic values of the point and line structural systems and their types (regular - increasing - decreasing - free).

The Third Stage: Implementation and Weaving on the Cardboard Loom:

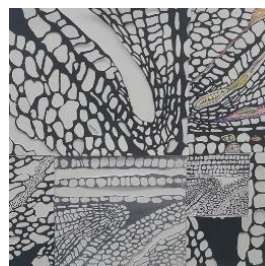
- Ask some questions about the business idea to draw students' attention.
- Painting printed in color on stretched Canson.
- Explanation of the idea of combining choose the best design spaces with the images used for the collage cells after photographing the design in color, choosing good design places and weave warping places, and the extent of benefit from merging them.
- Explanation of the cardboard loom and its uses Plastic warping directions:
 - Warping (in the horizontal and vertical directions - with supports - in an inclined direction - from one center - from two centers)
 - Making samples of weaving structures on a cardboard loom. Using several tools and raw materials such as needles - scissors - cutter - stretched Canson - colored feather pens - cotton threads for warp, and threads of wool and various artificial silks for the weft.
 - The fine potential of plain weave 1/1 and its extensions through displaying videos, links, and keywords as search engines - Plain Weave 1/1 - Hopsak.
- Types of embroidery stitches (running-Caneva-, zigzag,).



Picture (65)



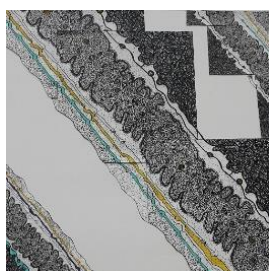
Picture (66)



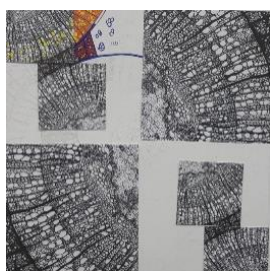
Picture (67)



Picture (68)



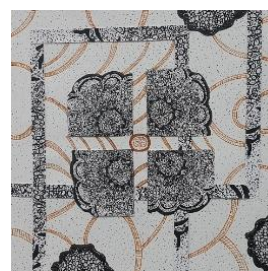
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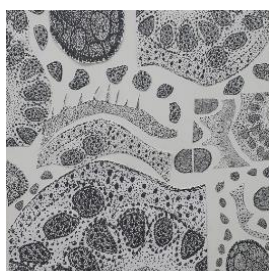
Picture (70)



Picture (71)



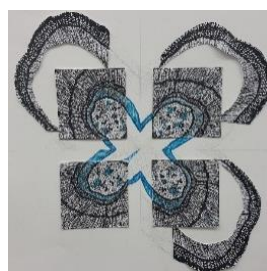
Picture (72)



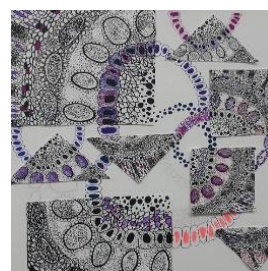
Picture (73)



Picture (74)



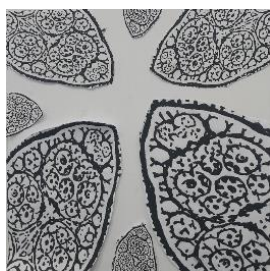
Picture (75)



Picture (76)



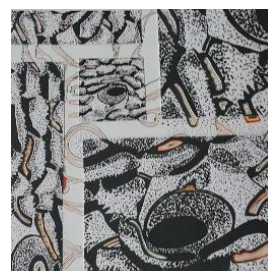
Picture (77)



Picture (78)



Picture (79)



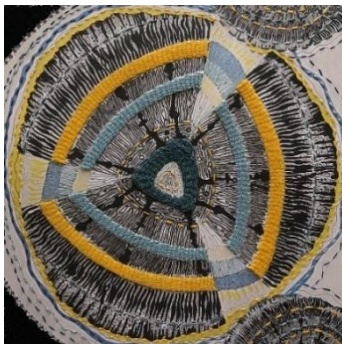
Picture (80)

Pictures (65): (80)

The second stage is some experiments and attempts using paper collage to come up with the best designs

The Third Stage: Implementation and Weaving on the Cardboard Loom:

- Ask some questions about the business idea to draw students' attention.
- Painting printed in color on stretched Canson.
- Explanation of the idea of combining choose the best design spaces with the images used for the collage cells after photographing the design in color, choosing good design places and weave warping places, and the extent of benefit from merging them.
- Explanation of the cardboard loom and its uses Plastic warping directions:
 - Warping (in the horizontal and vertical directions - with supports - in an inclined direction - from one center - from two centers)
 - Making samples of weaving structures on a cardboard loom. Using several tools and raw materials such as needles - scissors - cutter - stretched Canson - colored feather pens - cotton threads for warp, and threads of wool and various artificial silks for the weft.
 - The fine potential of plain weave 1/1 and its extensions through displaying videos, links, and keywords as search engines - Plain Weave 1/1 - Hopsak.
 - Types of embroidery stitches (running-Caneva-, zigzag,).



Picture (81)



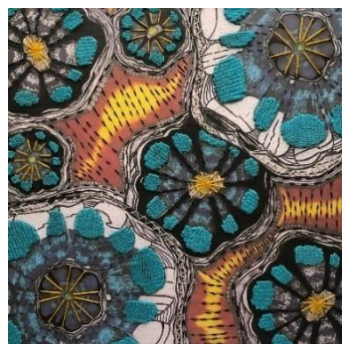
Picture (82)



Picture (83)



Picture (84)



Picture (85)



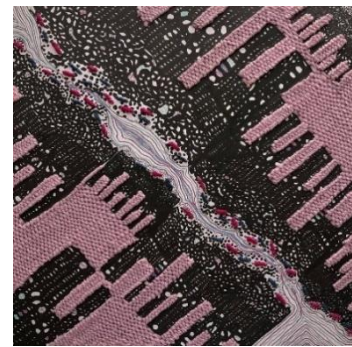
Picture (86)



Picture (87)



Picture (88)



Picture (89)

Pictures (81): (89)

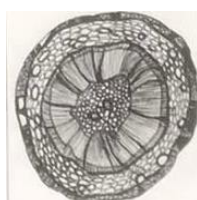
The third stage is the implementation of the actual design and synthesis between the collage and the places of weaving

The fourth stage: a vision of formation on the mannequin through the Photoshop program:

By taking advantage of the Photoshop program, each student builds an integrated board of ideas based on the beginnings of his research sources, from cell selection and inking, then the stages of enlargement, the collage stage, cutting pictures and coloring, Then photographing the design in color and starting to allocate textile areas and blocking and selecting exchange areas between the collage and the fabric, then choosing the best shots through the Photoshop program for display on the mannequin.



Picture (90)



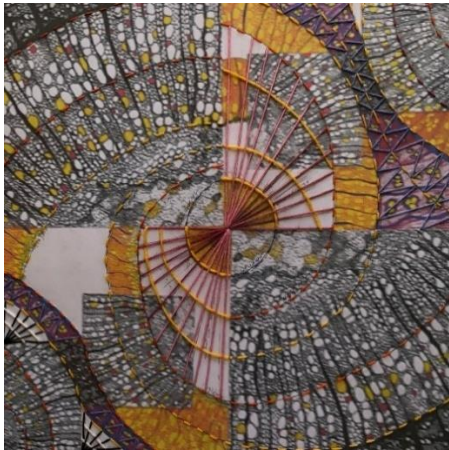
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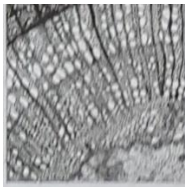
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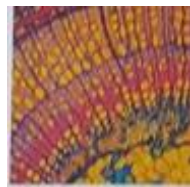
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Picture (94)



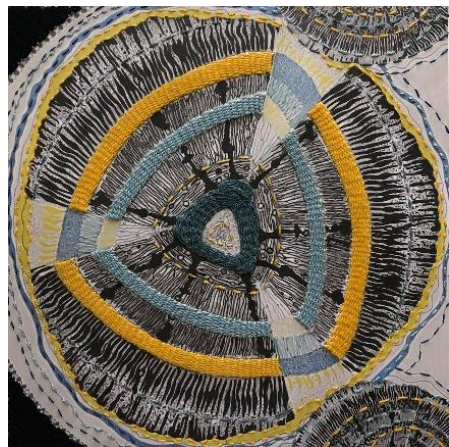
Picture (95)



Picture (96)



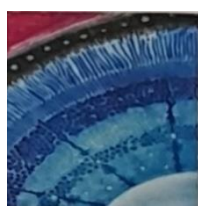
Picture (97)



Picture (98)



Picture (99)



Picture (100)



Picture (101)



Picture (102)



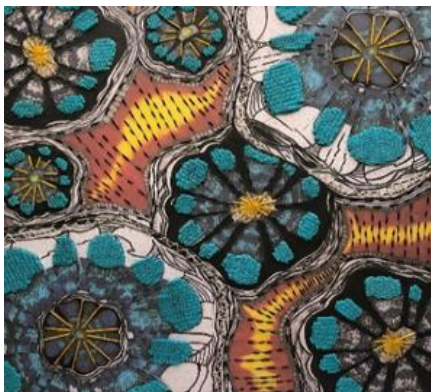
Picture (105)



Picture (103)



Picture (104)



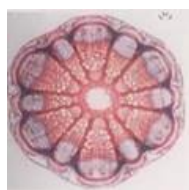
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Picture (109)



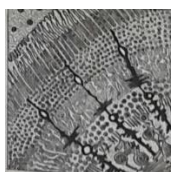
Picture (107)



Picture (108)



Picture (110)



Picture (111)



Picture (112)



Picture (114)



Picture (115)



Picture (116)



Picture (113)



Picture (117)



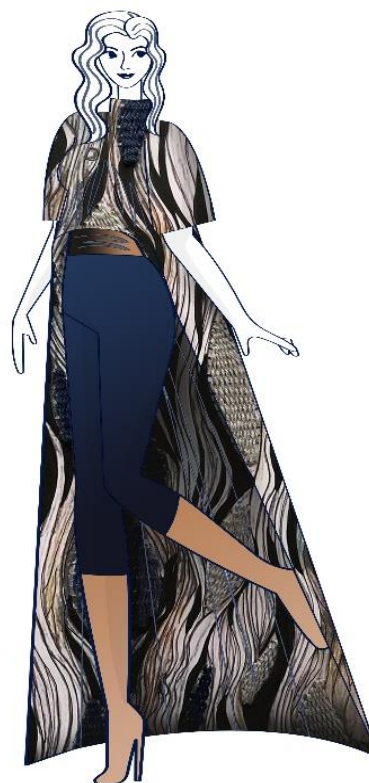
Picture (118)



Picture (119)



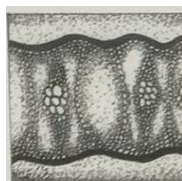
Picture (120)



Picture (121)



Picture (122)



Picture (123)



Picture (124)



Picture (125)

Results:

- Non-traditional plastic values were achieved through different plastic formulations, techniques, and raw materials using collage method, then warping and weaving in some parts.
- Deviating from the traditional ideas of innovation and modernity, while preserving the artistic values of the textile form.
- The elements and ideas used carry symbolic connotations within the textile work that differ from being from nature, which enriches the field of hand weaving expressively.

Recommendations:

- Investing in the modern thought of the arts with the software of the era in proportion to teaching in the artistic fields.
- The use of collage art as an approach to the adaptation of natural elements and various materials to reach an aesthetic form of design aimed at developing art education curricula.
- The wide range of embroidery style and its uses in many different craft projects.

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