

## Introducing the Nano Paper Technology (Tiny Nano Paper Art)

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### Abstract

Paper raw is one of the most important raw materials in life, which has many uses and different shapes. It is characterized by its easy formation, light weight and resistance to the conditions it is exposed to. As a result of the development, the paper forms and texture varied, and its sizes and colors varied, the paper function has changed. After it was written on it, it became an art with bases, a science studied and art acquired, and the problem of study is in the rapid development in the fields of life. There is no doubt that the development has covered many areas of plastic arts, but other areas have not developed, but the role of the original artist is to search for everything that is new enriches the world of art in its multiple areas and come up with innovative ideas to keep abreast of the development in the world and documenting and recording what has been reached, to be used by future generations, technical work is an integrated process gathering between technology and skill and thought, technicality must be developed is the basis of creativity on which the art work is based on.

The current study aims to: - Introduce a new technique (Nano Paper) in paper raw to enrich the artistic work.

- Documenting the art of Nano paper for the benefit of future generations.
- Contribute to the development and improvement of art education by introducing new technologies - Contributing to the preservation of the environment through the restructuring of paper and come out with useful and aesthetic work.

The importance of the study is illustrated in: - Clarifying the importance of paper raw and the extent of its technical capabilities

- The introduction of Nano Paper technology, and its documentation, contributes to enriching the art of paper.
- Open new horizons for artists using new technology - Utilizing new technology in a number of professional fields.
- Enhancing the skills of artists and art students with new technical techniques.
- Contributing in the utilization of damaged paper and recycles it in a technical way.

Study Methodology: The study was based on the experimental approach to reach and document the technical outputs that were developed and documented. The descriptive analytical method was used to explain and analyze the outputs.

The results of the study and its analysis: The answer was the possibility of developing a new technique of paper raw and the benefit of it in the fields of arts varied by 100% of the total sample, represented by 20 specialists and 20 students of the arts and in our analysis of the result it is clear that the sample of the study, both specialists or art students have recorded their admiration with the technical technique of Nano Paper and its technical outputs, and that this technology achieves valuable artistic enriching the technical culture of the community, and its documentation makes it as a map can be guided by and come out with a genuine and contemporary art work in several areas.

The most important recommendations of the study:

- Opening new and diverse fields of artistic expression in the Nano-Paper technology.
- Conducting studies and scientific research that benefit from the Nano Paper technique in the treatment and rehabilitation of some cases.
- Take advantage of the technology of Nano Paper to create special programs for people with special needs.
- Training and rehabilitation of low-income people on the Nano Paper technology for the work of private projects, as a source of material income, high material return and low-cost.
- Mainstreaming technology locally and globally to students of specialization and members of the educational body and art practitioners as an innovative technique can be used in many areas.
- Communicate with the Tourism and Heritage Authority to sponsor the technical outputs implemented by Nano Paper technology and employ them as a commemorative gift for dignitaries and official delegations.

**Keywords:** Introducing - Technology - Paper - Nano Paper - Art of micro-paper

### **Introduction**

The paper is composed of natural raw materials which have various and multiple uses, it can be written on or drawing over it or form it or redrafted, dyed and painted, the poet writes on it and the artist paints on it, and produces the artworks, and a lot of uses, the multiple usage of paper in all areas of life cannot be ignored.

The raw material of paper is one of raw materials that have a strong presence in the fields of life and the general artist, not only that, but it became used in all multi - different technical areas.

There is a special art of paper raw, but there is a science specialized in paper raw that has bases and rules, and there are materials taught alongside other curricula in the disciplines of the arts.

It is through the raw material of paper that the opportunity for expressive values is made available. It is a means by which the fingers are trained on the formative skill, and the sense of color, while recognizing the relationship between the flat and two-dimensional forms, is a diverse field of diverse experimentation that leads to new creative formulas (Khseifan, 2007 ).

Experimentation is the main door to innovation. The creative and innovating artist always tries to find new ideas to create original ideas and invent new methods and techniques that enrich the work of art and contribute to the production of innovative artistic works.

### **Problem of the study**

The paper material is soft, flexible and easy to form, with high technical value and low material cost. As a result of the various studies and practices of raw paper by the researcher and the non-renewal of the existing techniques, and with the continuous experimentation of this raw and trying to find scientific solutions and keep abreast of the development in the world, each artist has to keep pace with the development and the creation and innovation of new technical techniques contribute to change the enriching world of art in its various fields, and documenting what has been reached as a map for future generations can be utilized.

### **Question of the Study**

The study's question is: Is it possible to develop new raw paper technology and take advantage of them in the diverse fields of arts?

### **The importance of the study**

- Explain the importance of raw paper and the extent of its technical capabilities.
- The development and documentation of Nano paper technology contributes to enriching the art of paper.
- Open new horizons for artists using new technology.
- Take advantage of the new technology in a number of professional fields.
- Enhance the skills of artists and art students with new technical techniques.
- Contribute to the utilization of damaged paper and recycle it in a technical way.

### **Objectives of the Study**

The objectives of the study are as follows:

- The introduction of a new technique (Nano paper) in paper raw enriches the artwork.
- Documenting the art of Nano Paper Art for the benefit of future generations.
- Contributing to the development and improvement of art education by introducing new technologies.
- Contribute to the preservation of the environment through the restructuring of paper and come out with a useful and aesthetic work.

### **Study Approach**

The study was based on the experimental approach to reach the newly created technical outputs and document it, and the analytical descriptive method was used to explain and analyze the outputs.

### **Terminology of study**

Introducing: The dictionary defines the meanings of introducing of a new tool in the sense of: created, invented while the lexicon mediator defines introduced the thing: find it new.

The meaning of introducing the thing: created, invented ([www.almaany.com](http://www.almaany.com)) introducing in the procedural definition is innovation and finding something new.

Technology: The dictionary the whole meanings define technology: as a technique in the completion of work or scientific research, or complete means and methods that specialize in his profession or art, as the mediator lexicon dictionary defines technology as: a technique that is specialized in art or profession ([www.almaany.com](http://www.almaany.com)). The procedural definition of technology is the style and method developed in the art of paper. It is called Nano Paper.

The art of Micro-paper (Nano): Modern style uses raw paper and the term Nano to denote the technique used as tiny.

### Study components

**First:** Nanotechnology.

**Second:** the art of paper.

**Third:** Introducing a new technology in paper raw

### First: Nanotechnology

The most important technological development in the last half of this century was the invention of silicon or transistor electronics and electronic laboratories. Their development led to the emergence of so-called microchips, which led to a technical revolution in all fields such as medicine, communications, computers and others. Until 1950, there was only black and white television; there were no mobile phones, no digital watches or the Internet. All these inventions were due to the small segments. On the basis of the increasing demand, this led to a significant decrease in prices making it easy to enter into all the consumer electronics that surrounds us today.

Over the past few years, however, a new term has emerged in nanotechnology, which has put its weight on the world and has become the focus of attention (<https://en.wikipedia.org/wiki>)

Nanotechnology has revolutionized technology and has become a cultural component of people's conversation. Nano science has witnessed rapid growth in the growing research output in many fields ([www.nano.ksu.edu.sa](http://www.nano.ksu.edu.sa))

The origin of the word "Nano" is derived from the Greek word "Nanos", a Greek word meaning dwarf and meant, everything is small and here means the technique of Nanoparticles or nanotechnology micro-technology or miniatures. Nano science is the study of the basic principles of molecules and compounds that are not more than 100 nanometers. Nano is the most accurate metric unit known to date. It is one billionth of a meter, ten times the atomic measurement unit known as angstrom. The Nanometer is defined as part of Billionth of a meter, and a fraction of a thousand micrometers. To bring this definition closer to reality, the diameter of the head hair is approximately 75,000 nm, and the red blood cell is up to 2,000 nm. The Nano science is the boundary between the world of atoms and molecules and the world of macro.

Figure (1) shows a comparison between the sizes of nanoparticles (<https://ar.wikipedia.org/wiki>)

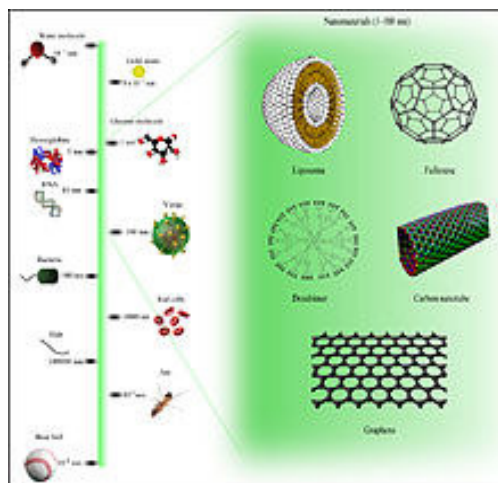


Figure (1)

Many countries have undertaken studies on this technology, and other countries have established specialized universities for nanotechnology, commissioned a group of experts to study this technology and the establishment of institutes and research centers for nanotechnology.

The concept of Nano has become a term that has spread in many societies. The use of the term for everything has become small. It has become a sign of everything that is so small called Nano. The word Nano has been translated into micro-matter. It is commonly used in the Arab world. The King Abdullah Institute for Nanotechnology was created by King Saud University and the use of the term Nano in the name is mentioned. In his study, al-Mishikh, a professor at King Saud University, mentioned in his study the Arabization of the foreign term or its translation, which concluded that "the best is taking the foreign term without translating it" in some bioinformatics ([www.faculty.ksa.edu.sa](http://www.faculty.ksa.edu.sa))

To confirm this, some paper techniques, for example, are still being used the original term without the Arabization of Quillink, Origami, Collage and other terms, the term Nano became common among people ([www.Nano.ksu.edu.sa](http://www.Nano.ksu.edu.sa)). Nanotechnology will also be traded as a technical term among art professionals.

## **Second: The art of paper**

### **Introduction**

When mentioning the word paper, the first thing that comes to the mind of many is to write on it, but the paper has multiple uses in different areas of life.

In the second century BC, the paper was invented by the Chinese Minister of Agriculture (Tsai Lin), and the beginning of making paper from the bark of the mulberry tree, it was cut to fiber, then grinded and spread over the body to dry under the sun, and after a while paper makers learned that the cannabis plant and the breach and even the old fishing nets can be grinded and spread and the work of paper sheets (Khseifan, 2007).

Al-Mahdi (1987) said that the paper industry "is a mixture of cellulose fibers extracted from trees, plants and ballet where the raw fiber is soaked and crushed in the form of dough and then formed by hand or a certain machine to be as a form paper sheets".

As the paper industry developed through the ages, the skills of the Europeans increased in harnessing the power of water to run the paper mills to the price of paper. Paper was a great source of wealth for libraries in many creations in all sciences. Many texts were translated and documented on papyrus or slavery and recorded on paper and collected in the form of books (Khseifan, 2007).

The use of paper is not limited to books, but the scientific and technological development has changed the function of paper, the shape of the paper, its size, surface and color, making its use important in many areas of life for example, use paper in paper currency, wall paper, greeting cards, gift wrapping, paper napkins, medical clinics, correspondence, and many other uses, including many fields. The paper has a special place after it became an art of its foundations and bases, it became a learned and informed science.

We have found many scientific treatises in various disciplines, including the paper material. The study of Zewail (2009) dealt with the raw material by using paper pulp and presented methods to treat the surface of paper pulp to impart the properties of color and concrete to the ore, as Hafez (2016) In his thesis, Graphic specializes in a contemporary vision of employment to use the collage technique in designing and producing the contemporary book, he uses the technique of collage in his thesis.

As for Mohammed (2015) in the clothing and textile section, she used paper raw material to benefit from it in the fields of small industries through the introduction of the subject of the possibility of taking advantage of the art of Orgami in the work of innovative artistic crafts and applied it in the fields of small industries.

The study of Wahib (2012) has benefited from the paper material in the formation of paper raw materials in the works of art to improve the innovative ability of children in the kindergarten stage- Department of Art Education.

We also find that the study Ajiz (2013) A program based on the production of some games for the development of visual arts among kindergarten children - Department of Educational Sciences.

This diversity in the fields indicates the important place for the paper in many different disciplines, and these specialties are only models illustrate the importance of raw in many fields, as well as the diversity of technologies used and the multiplicity goals of usage.

"The material of the paper reflects the feelings and emotions we have to pay because we tamper with them and subject them to our experiences and we grow what we got from them and then fortified to benefit and take advantage" (Allam, 1978) In addition, it performs functions to serve the daily life, but it helps to think of the complex and the way to empty the nervous and life pressures through tampering and shaping them in the hands of the artist in different ways and different techniques.

#### **The most important techniques of paper raw**

The paper has now become of different types and shapes and multiple thicknesses, but the technology used has an important role that cannot be overlooked. "The paper may be one, but the ways of its formation may change its shape, texture and function." (Khseifan, 2007) The varied and different paper material which enriches the work of art and result of the view of a number of scientific treatises, books and specialized sites, which dealt with the paper material, the researcher concluded to a number of specific techniques to paper material, and table (1) -prepared by the researcher - explains the most important techniques for paper raw

**Table (1): Techniques of paper raw**

| <b>The most important techniques of paper raw</b> |                                  |
|---|----------------------------------|
| Addition (prominent)                              | Paper sheets                     |
| Deletion (gummy)                                  | Pop-Up                           |
| Same level  | Quelling                         |
| Semi-prominent                                    | Holographic composition of paper |
| Fabric  | 3D                               |
| Origami   | Pinhole                          |
| Collage   | Folding-creasing-knuckle         |
| Paper dough                                       | Cut paper                        |




#### **Cut and shear the paper**

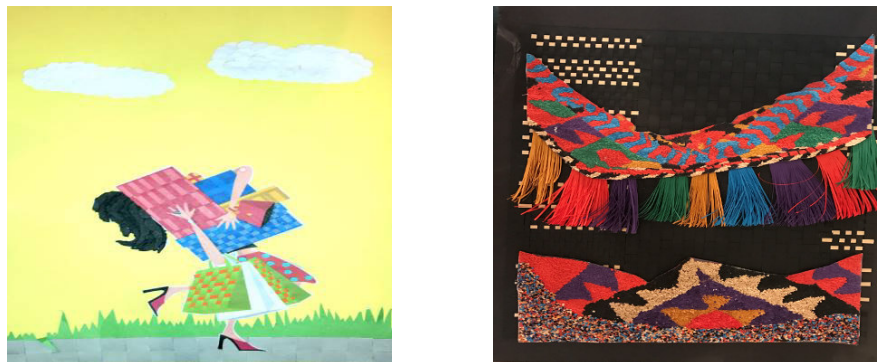
The paper cutting and shearing set is a paper specialty technique, some of the techniques in this group are used by school students in the lower grades for their ease and beauty, some of it is used by amateurs and art lovers, some are taught by art specialists and are taught in specialized scientific academies. All these techniques, according to the ease of their exercise, are an area of artistic expression for the members of society.



The methods of cutting and shearing paper will be discussed in particular as they are steps designed to reach the new technology Nano Paper, which was the product of experimentation and development of this group of techniques, and table (2) - prepared by the researcher - will clarify the set of cutting and shearing paper

**Table (2): techniques of cutting paper**

| Technology  | Models for technology   |  |
|---|---|--|
| Technique:<br>-Cutting paper by hand<br>- Cutting by scissors |    |    |
| Technique:<br>-Cutting with Awl                               |   |   |
| Technique:<br>-Cutting by scalpel                             |  |  |
| Technique:<br>(Pixels)<br>-Regular<br>-Irregular              |  |  |



**Figure (2) models implemented with paper raw using multiple techniques**

### **Third: Introducing a new technology in paper raw**

The work of art opens the door to experimentation widely, which is an important input to identify methods and select and organize the various variables in relation to the work of art (Jad, 1989).

Artistic work is an important focus of innovation. It combines talent, technique and skill in a cohesive fabric that combines the foundations of art and values with the technical aspects of creative work.

The raw material is an essential raw material in the art of craftsmanship, which achieves artistic values enriching artistic culture, "and is associated with the desire for production and the sense of happiness and pleasure when practicing it" (Hassan, 1994).

As a result of the practice and experimentation, an innovative technology was born, namely, Nano Paper, which is added to the techniques of paper raw as a new technique, which can be used in many technical practices and achieve artistic values enriching artistic culture.



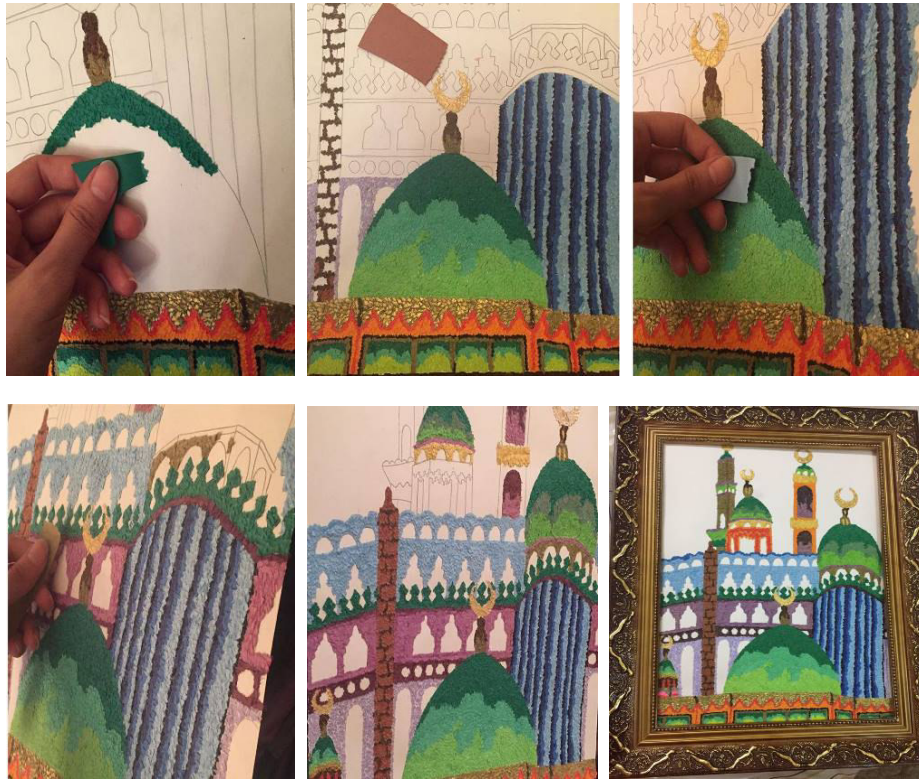
**Picture (1): the techniques used on the right of the picture are as follows: 1-Cutting with scissors - 2 Cutting by hand 3- Cutting by the scalpel with its first image and the size of the pieces is clear and large size**



**Picture (2): shows the small size of the pieces from the previous phase and the addition of pieces**



**of paper on the pictures**




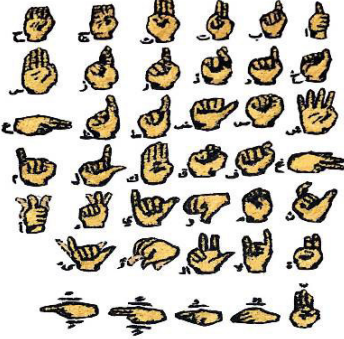



**A set of pictures (3): showing the integration of paper and its small size  
The shape was drawn and then the spaces were filled using recycled paper which gave it a feeling of integration**



**Picture (4): combines the technique of cutting using the scalpel after developing it, it is represented by the scarf above the head and Nano paper in green leaves and facial borders, internal facial features**

Table (3) - prepared by the researcher- shows some outputs of the Nano Paper technology

| Models of newly developed technology (Nano Paper )                                   |   |
|--|---|
|     |   |
|     |  |
|  |   |
|  |   |

Determinants of the study

## Raw Material

Paper raw and the following will be used:

- Different types of paper according to the design to be executed.
- Recycled paper.
- Paper envelopes made from: Paper - Metal paper, such as some candy wrappers.

## Tools

- Flat hard surface.
- Micro Awl
- Serrated head scalpel.
- White gum (wood gum).



## Models for some of the tools used in Nano paper

### The introduced technology (Nano Paper)

The technique will be explained according to the following steps:

- Choose the type of paper you are working on, preferably flat paper and has no drawings.
- The design to be executed is selected and printed on the surface of the selected paper and then selected paper to be filled and filled in design areas.
- The paper to be worked on is cut (approximately 1 x 3 cm) is cut to make it easier to work. Paper size is not mandatory but preferably a small size.
- Put the gum on the edges of the design in very small quantities and a small area so as the gum doesn't dry before completing the task.
- The paper is held by the hand which is the least used and the scalpel by the hand which is used for writing, and then put the paper on the edge of the specified design with pressure on the mattress and then pull the paper, which leads to a small part of the area of the grocer and has been stuck in the flat paper - Work back - and repeat the process sequentially, with emphasis on the importance of achieving the borders of the design first, and then performs the interior so the design become clear.
- The second color is selected in the design and repeated several times.



**A set of pictures (5): illustrates how Nano Paper works**

The general plastic arts have an effective effect on the lives of individuals and groups, It raise their senses and feelings, increase their energies and abilities and improve their mood. Art helps sense of responsibility as it helps to imagine. The refined artist takes the raw as a way to express his artistic vision of evolutionary creativity (Hafez, 2016).

The paperwork art has a fundamental value, it helps to sense the responsibility and helps to imagine and innovation, and the technology of Nano paper help in training the people to be patient, it takes time and effort, but the result that comes out of the work, make us repeat times and times every valuable thing takes its time to be a piece of expensive price, diamond stone takes a long time to turn into a precious stone, everyone is happy to see it as it has a high material value, as well as professional pieces take time, effort and dedication in the work and precision in implementation, overlap in artistic form with the groundwork of the artwork to get a unique and distinctive Art piece. Group 5 shows the professionalism and quality in implementing the Nano Papers and sincerity in working with patience.





A set of pictures (6): Proficiency and quality in the implementation of Nano Papers



Picture (7)



picture (8)

- Picture (7) The King Abdul Aziz University logo is implemented by Nano paper Technology
- Picture (8) His Excellency the Director of King Abdul Aziz University receives the logo of the university as a souvenir of its value.

### The Study Results and its Analysis

Based on many ongoing experiments and practices, a new paper-based technology, Nano Paper, has been introduced. 10 paper art outputs have been presented to:

- Twenty specialized art arbitrators

- Twenty Art students

To answer the question of the study which is:

Is it possible to develop new raw paper technology and take advantage of them in the diverse fields of arts?

The answer to the question of the study by 100% of the total sample, is the possibility of the development of new technology and the use of paper in the fields of various arts.

In our analysis of the result, it is clear that the sample of the study, both from art specialists or Art students, have impressed with the serious technology Nano Paper and its technical outputs, and that this technology achieves the artistic values enrich the technical culture of the community, and documenting them as a road map can be guided by and come out with contemporary work of art and in multiple fields.

#### Recommendations

The researcher recommends the following:

- Open new and diverse areas of artistic expression with the Nano paper technology.
- Taking advantage from the art of Nano paper to enrich plastic arts implemented using paper raw.
- Taking advantage of the Nano paper technique in opening up multiple fields of artistic creativity and subtracting contemporary artistic visions.
- Conducting studies and scientific research that benefit from the Nano paper technique in the treatment and rehabilitation of certain clinical or occasional conditions.
- Take advantage of the technology of Nano paper to create special programs for people with special needs.
- Urge researchers to provide scientific studies on the possibility of taking advantage of Nano paper technology in the introduction of innovative art work and applied it in the fields of high-level industries.
- Training and rehabilitation of low-income people on the Nano paper technology for private projects, as a source of high-yielding material income and little material costs.
- Conducting specialized studies to get out of the tourist heritage works carrying the local identity implemented by the Nano paper technology and to communicate with the tourism and heritage authority to sponsor the products and marketing them as a tourist product.
- Mainstreaming technology locally and globally to students of specialization and members of the educational body and art practitioners as an innovative technique can be used in many areas.
- Communicate with the Tourism and Heritage Authority to sponsor the technical outputs implemented by Nano paper technology and employ them as a commemorative gift for dignitaries and official delegations.

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