

## **The applications of origami art using 3D digital printing technology in design jewelry**

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### **Abstract:**

Today we live in an online world, the internet allows us to talk and get to know anyone anywhere from all over the world, and with the advancement of technology and the increase in access to the internet, the influence of art or artist is no longer confined to the boundaries of an art gallery but art can now be produced and distributed to people around the world, and this also allows more people to view the art. Creativity is the new, useful and authentic production that draws attention and distinguishes each artist from the others through his/her artistic creations in the use of art and technology together. Despite the rapid development of technology, the many benefits that it adds to art in general, there is a controversy that has abounded between artists and creators about the relationship of art to technology, some of them consider that aesthetic values have fallen and fell in the face of technology and others consider that technology has created new aesthetic values. Therefore, the study and the idea of the research focused on how to take advantage of the features of origami art with 3D digital printing techniques? And the extent to which the possibility of creating designs for Jewelry based on 3D in a modulation way to extract innovative designs from the features of origami art with 3D printing techniques through the concrete and tangible form of designs, and how to adapt modern technology to create designs compatible with the technological development of the prevailing fashion? The research focused on the description of sensory and mental features and the use of technology that helps the designer of Jewelry to excel, as well as the study of some designers and Jewelry, modern 3D printing techniques, studying the features of origami art, designing Jewelry and the foundations of formation, and studying 3D printing and the most important companies producing them and the used materials to take advantage of them in the implementation process.

### **Keywords:**

Technology - Jewelry- 3D printing - Origami art.

### **Introduction and Problem of the Research:**

Jewelry has been influenced by modern wearable technology on the innovations of bracelets, earrings and smart stones, and the importance of jewelry on our bodies makes it an ideal place

to put all kinds of basic technology. Jewelry is an important symbol in civilizations and cultures, so a civilization or culture is not devoid of a special touch and character that is added to its jewelry, and jewelry printing is an invention that has contributed to the spread of culture and its progress throughout history, and it has contributed to the development of science, literature, and arts. Printing machines have saved time and effort to obtain many copies of jewelry in an easy way, the first printer was invented in 1045 in China, then it developed and varied in size, types, uses and speed. 3D printing is a form of additive manufacturing technology where a three-dimensional object is created by placing successive thin layers of material on top of each other. 3D printers are usually faster, cheaper, and easier to use than other technologies.

The design of jewelry is one of the important areas that occupy the minds of designers. Jewelry is one of the most important things that a person uses, whether it is for internal beliefs prevailing in society or for decoration, and sometimes jewelry is for saving money and investing it. Jewelry is based on several components, the most important of which is the shape or the aesthetic aspect, so the element attracting the eye comes first, the form, then comes the safety factors during use, the weight and the material used, and most of the time the jewelry designer addresses the thought of women, as they are the ones who wear most jewelry for adornment, and some jewelry designers have thought that this is done through the features of some arts such as origami art and the use of digital technology, which have become a source of great inspiration for many jewelry designers to transform the idea of folding technology into 3D artistic creations to create different models of jewelry that are more distinctive.

Based on the foregoing, and through the researcher's briefing on the techniques of 3D printing and origami art, and on contemporary jewelry designs for a group of international fashion designers, I found a match between the features of origami art and three-dimensional printing techniques that contribute to the concept of designing ornaments with the concepts they contain that can be an important source of innovation in line with the designer's future vision of how to create modern jewelry designs, and through that the researcher was able to summarize the research problem based on imposing the following questions:

#### **Search questions:**

- Are there international Jewelry designers who have used the techniques of digital 3D printing, origami art?
- How far the innovation in Jewelry designs based on 3D digital printing and origami art?
- To what extent can origami's art features be used in creating jewelry designs using 3D digital printing technology?

#### **Research Importance:**

- Shedding light on the latest technology in 3D digital printing, and the extent benefit including Jewelry design.
- Steering on how to make use of origami in jewelry design.
- Directing attention, the factory jewelry designers to modern technology to take advantage of it.

#### **Research objective:**

- Study the works of Designers of international jewelers whose works are distinguished by the use of 3D digital printing techniques, Origami art.

- Innovation of new designs with digital 3D printing techniques, attributes to origami art.

### **Search limits:**

- Temporal boundaries: 2010: 2020.
- The Spatial Boundaries: The Role of Global Fashion Design.
- Thematic boundaries: the study of origami art, its features and distinctive techniques, the study of three-dimensional printing techniques and their use, the world's fashion designers and their influence with 3D printing, the origami art, the creation of jewelry designs with the features of origami art in the style of formation, three-dimensional printing suitable for various parties and occasions.

### **Research Hypothesis:**

- Innovative Jewelry designs can be created based on digital 3D printing and origami art.
- There are international Jewelry designers who have used the techniques of digital 3D printing and the art of origami.
- Features of origami art can be used to create 3D digital printing for jewelry designs.

### **Research Methodology:**

- An applied descriptive approach.

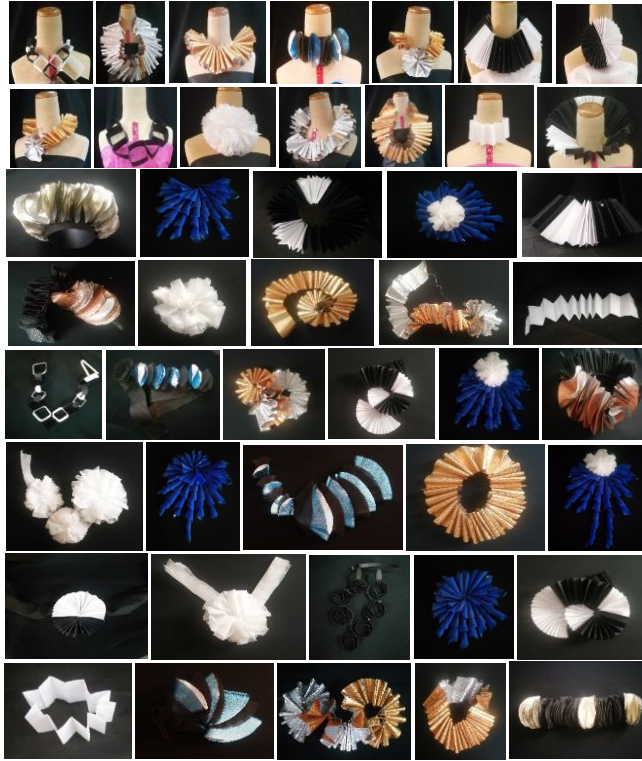
### **Procedural steps for research:**

#### **The theoretical side:**

- |                                   |  |
|-----------------------------------|--|
| -Concept of ornaments             | - Designing ornaments                          |
| -Jewelry in the era of technology | - Designing jewelry in the field of technology |
| -3D Printing and Ornaments        | - Origami Art and Ornaments                    |
| - 3D Jewelry Designers            | - Origami Jewelry & Art Designers              |
| - The practical side              | - Recommendations                              |
| - Research results.               | - Search references.                           |

### **Second: The Practical Framework:**

Due to the importance of art and technology, the modules and features of origami art, 3D printing, and the computer were used to create innovative jewelry designs, and a number of 30 suggested designs of jewelry were formed, and accordingly a field study was made based on a survey of the opinions of specialists in jewelry from specialized academics. About the designs of the suggested jewelry for the research, which are Necklaces - Bruges - Bracelets. Then, 15 designs from the jewelry designs that obtained the highest percentage were selected based on the opinion of the referees, and they were processed through the computer through the “photoshop” program, “Illustrator”, and then some designs were chosen to be executed by means of 3D printing and metal forming technology. The researcher will clarify this with some models for specialists that clarify the idea of implementation.

**Suggested jewelry designs to search****Legalization of search results tools:**

- Honesty and fortitude.
- Questionnaire Opinion poll for evaluating academics in proposed jewelry designs.

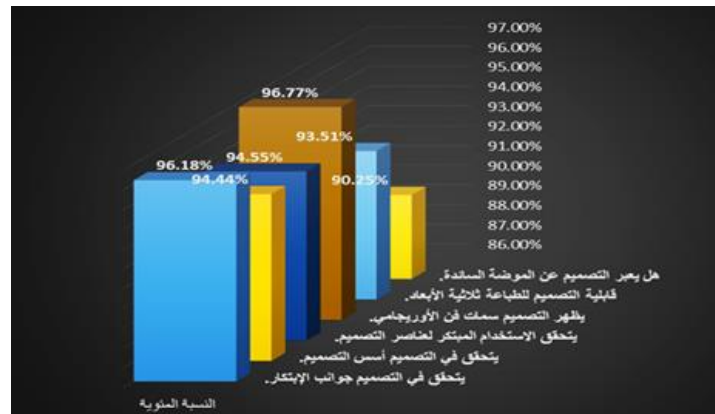
Prepared a questionnaire for academics specializing in jewelry.

To judge the validity and consistency of the questionnaire

Evaluation of the proposed jewelry designs. The questionnaire includes (6) questions:

- 1- **The first question:** Are innovation aspects being realized in the design?
- 2- **The second question:** Are design principles being realized in the design?
- 3- **The third question:** Was innovative use of design elements being achieved?
- 4- **The Fourth Question:** Does the design show Attributes of origami art?
- 5- **The fifth question:** Is there design ability for 3D printing?
- 6- **The sixth question:** Does the design express the prevailing fashion?

النسبة المئوية	الأسئلة	م
96.18%	يتحقق في التصميم جوانب الابتكار.	1
94.44%	يتحقق في التصميم أسس التصميم.	2
94.55%	يتحقق الاستخدام المبتكر لعناصر التصميم.	3
96.77%	يظهر التصميم سمات فن الأوريغامي.	4
93.51%	قابلية التصميم للطباعة ثلاثية الأبعاد.	5
90.25%	هل يعبر التصميم عن الموضة السائدة.	6



### Results of practical application questionnaires:

By analyzing the table, it becomes clear that aspects of innovation are achieved in the designs through (flexibility, fluency, and modernity) by 96.18%, and the foundations and elements of the design are achieved through (balance, harmony, coherence and unity, and proportion) at a rate between 94.44%, 94.55%, it is clear that the designs are appropriate to the used techniques that show the designs with the features of origami art through (units, structural form) by 96.77%, and that the designs have the ability to 3D print through (shape, units, and proposed technology) by 93.51%, the design expresses the prevailing fashion through (Fashion and modernity) by 90.25%.

### Research Recommendations:

In light of the results of the research, some recommendations can be directed to the fashion designer:

- The necessity for designers specialized in colleges of art to make continuous courses to use computers in the field of jewelry design to convert traditional ideas into creative designs.
- Professionals should pay attention to the features of art and use it in the foundations of design.

- The necessity to use and make use of the jewelry formation to create the innovation process.
- The need for designers and specialists in colleges of art to pay attention to technological progress to take advantage of modern technologies.
- The necessity of using three-dimensional printing in jewelry design to take advantage of technological progress.

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