

# Application of 3D Printing in Interior Design and Furniture

**Dr. Shima Abd El Sataar Shehata**

Lecturer - Faculty of Education – Helwan University - Egypt

[shimaashehata@hotmail.com](mailto:shimaashehata@hotmail.com)

## Abstract

3D printers are a scientific and technological revolution , not only in modern technology field, but also in various areas of life. There is no field that the printer had not an effect there. It is technology to medicine, engineering, education, science, dentistry, down to interior design and furniture.

This research explains concept of 3D printing, and its application in interior design and furniture, and its role in modern design trends, and explain the differences and similarities between them and the techniques of manufacturing three-dimensional forms using the computer.

**Key words:** 3D Printing, Rapid prototype, Additive manufacturing.

## Statement of the problem:

Traditional forming and manufacturing techniques carry a range of restrictions for designer, it is not possible to produce everything that is designed or painted. However, the designer often finds himself capable of achieving his creative ideas or design through technological scientific progress, where the emergence of modern technologies such as 3d printing. So the research tries to answer the following questions:

- What is the 3D printing technology?
- How can the designer exploit the possibilities of 3D printing in the field of interior design and furniture?

## Importance:

Explain and highlighting the importance of 3D printing as a modern science application, and how to use it in the field of interior design and furniture. The research deals with how to add modern technical reality to the traditional tools and methods of the designer, based on the necessity for knowledge and application.

## Objectives:

- View and study the technique of 3D printing, and its proposed uses in the field of interior design and furniture.
- Explain the differences and similarities between the 3D printing technology and traditional techniques based on the computer as CNC in the production of 3D forms in the field of specialization.
- Explain the importance of 3D printing for applications of modern design trends such as biomimcry, parametric.

## Hypothesis:

- The 3D printing technology if employed well; will contribute to solving the implementation problems for creative ideas of the designer- it could produce non-traditional and complex

designs that cannot be produce using traditional techniques -in the field of interior design and furniture.

**Methodology:**

The research is based on the analytical descriptive approach as the most appropriate methods that are consistent with the nature of this research.

**Contents:**

After discusses the definition of 3D printing technology, the research contains four main parts, as follows:

**(1) 3D Printing technology:**

**(1-1) Brief History .**

**(1-2) 3D printing techniques:**

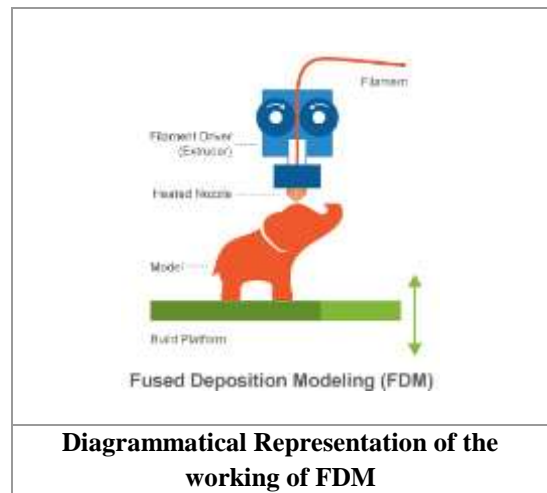
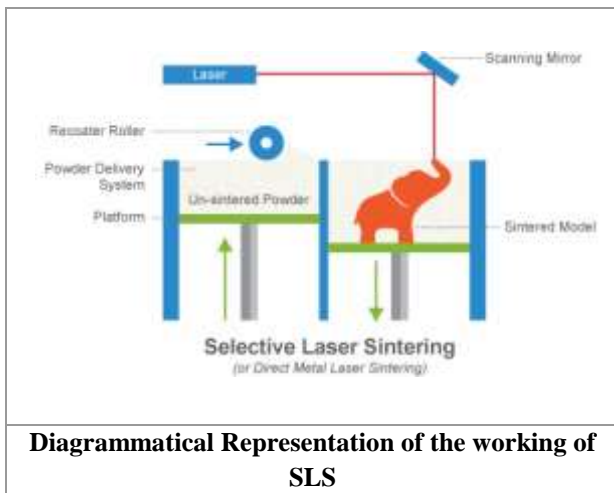
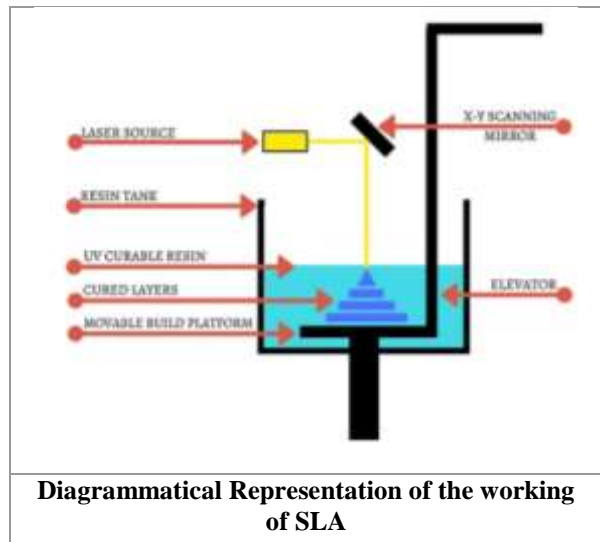
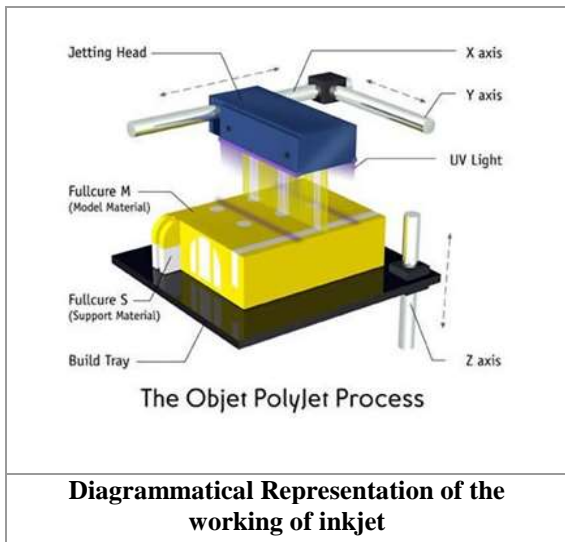
This part explain simply the working of each technology:

(1-2-1) Material jetting.

(1-2-3) SLS” Selective Laser Sintering”.

(1-2-2) SLA “ Stereolithography “.

(1-2-4) FDM” fused deposition modeling”.



**(1-3) Stages of the 3D printing process :** This part deal with all the stages ( shown in figure no 1) in detail .

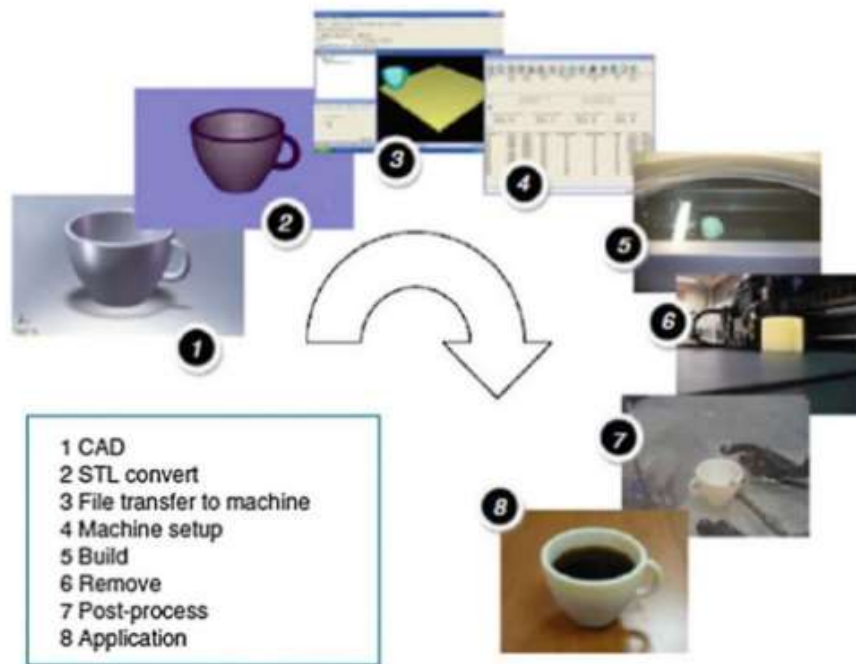


Figure (1) showing all eight stages

**(2) Uses of 3D printing in interior design and furniture:.**

This part explain every following point : Definition , Advantages , Disadvantages , Suggestions for use in interior design and furniture field .

- (2-1) Print prototype or models.**
- (2-2) Complete product.**
- (2-3) Parts of a product.**
- (2-4) Molds for other products.**
- (2-5) Copies of an existing product.**

The research deal with all the above uses in detail. The following is brief example:

**(2-1)Print prototype or models:**

<b>Definition</b>	printing Miniature Models or prototype.
<b>Advantages</b>	- Easy and accurate implementation. - The possibility of printing with the same materials of the real product but on a smaller scale. - The possibility of printing the model with other alternative materials.
<b>Disadvantages</b>	- need for post-processing that will depend on print technique, material and print settings , like sanding or polishing and prototypes may need to be painted, dyed or metal plated to achieve a finished look.
<b>Suggestions for use</b>	- Print mini-models of global or historical products or traditional products for learning and study. - Printing mini-models for furniture, interior design and architecture for students and designers to present and market ideas and products, or for testing.



(1)



(2)



(3)

(1) a set of miniature models for global famous seats - it has been implemented a three-dimensional printing technology from the severity of white plastic and then painted.

(2) shows a vertical miniature sector , It was implemented with three-dimensional plastic printing technology.

(3) smallest working drill , 3D printed.

### **(3) The most famous design trends that require 3D printing technology:**

**(3-1) Biomimicry.**

**(3-2) Parametric .**

**(3-3) Hi-Tech .**

If applied science such as nanotechnology and computer science combine with modern technologies such as three-dimensional printing, the designer can produce a large number of complex or highly complex products that belong to any design trend .

### **(4) Comparison between techniques of obtaining 3D forms, which depend on the computer : 3D printers and CNC machining.**

Comparison points is : control methods , the beginning and development , advantages, manufacturing methods& material lost , production cycle, production lines , material kind , specification of production places , and product finishing .

### **(5) Positives and negatives for using 3D printing technology.**

#### **Results:**

- 3D printing will not replace traditional manufacturing processes currently. However, will strengthen them and be complementary to them.

- The 3D printing technique minimize the stages of product manufacturing into: Computer Design → Printing → Finished Product, It also shortens the time required to market a new product in many areas by improving product quality, combining design and manufacturing directly, and reducing the cost of the product by reducing the cost of the development and modernization phase.

- Modern technologies such as 3D printing are only means to help the designer - who will remain master of the situation - he is innovating unique and complex designs that feed those technologies.

- 3D printing is efficient in energy consumption, It also less waste, that making it environmentally friendly. The products manufactured from it - especially with continuous progressive development in speed and precision and search for better materials - are lighter and longer lasting and have a complex and sustainable design.

**Recommendations:**

- Faculties of applied arts and trade unions should encourage and guide designers and learners to learn about the applications of modern science and use them in the field of specialization.
- Art faculties and the ministry of culture should make it clear to designers that 3D printing technology is an aid to their innovation, not a tool for replicating western ideas and designs to deepen the crisis of identity loss.
- The responsible authorities should establish laws for the protection of intellectual property rights

**References:**

- 1-Magdassi, Shlomo and Kamyshny ,Alexander\_-** Nanomaterials for 2D and 3D Printing- John Wiley & Sons-2017.
- 2- Narayan ,Roger\_-**Rapid Prototyping of Biomaterials: Principles and Applications - Woodhead Publishing, 2014.
- 3- Stucker, Brent and others -** Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing- Springer, New York , Second Edition,2014 .
- 4- Wimpenny ,David Ian and others -**Advances in 3D Printing & Additive Manufacturing Technologies- Springer, New York, 2016.
- 5- Yee ,Wai & Wong ,Chee How & Chua Chee Kai\_-** Standards, Quality Control, and Measurement Sciences in 3D Printing and Additive Manufacturing- Academic Press, 2017.
- 6-Zukas, Victoria & Zukas ,Jonas A.\_**- An Introduction to 3D Printing- Design Pub. , First Edition 2015.