

## Sustainability standards and their impact on contemporary sculpture design

Dr. Mayssa ahmad elfar

Assistant Professor, Department of Sculpture, Architectural Formation and Restoration  
Faculty of Applied Arts, Damietta University

[Yossa81@yahoo.com](mailto:Yossa81@yahoo.com)

### Introduction: -

Recently, all efforts aim to preserve the environment, including all organisms and plants it contains, and to benefit as much as possible from recycling and benefiting from waste through sustainable design to activate the positive impact of the environment on human welfare and health, to develop the concept of green design and its recycled materials from natural resources towards the core human values of the creative system that reshape the contemporary design map and curricula in a way that is compatible with global environmental systems. Richard Wilson, founder of the Kolab Library, one of the most important institutions that aims to review the latest sustainable materials in the field of design and its environmentally friendly sources, confirms that modern technical developments have extended the production and manufacture of materials and their ability to simulate the structural and formal properties of natural materials, but often exceeded them to more effective properties that are compatible with human health and the environment, especially with “nano” technologies, which provided us with completely new materials with unique and strange properties, which opened the door wide recently, for such technologies and others entering the field of reproducing and creating more effective and sustainable industrial materials (Grass 2021)<sup>1</sup>.

As the sculptor has always kept pace with the spirit of the times, using technology according to the requirements of each stage in which he lives, it was necessary for him to be the first to be interested in preserving the environment and using those environmentally friendly materials, which had a clear impact on the designs of his sculptural works; as the design differed from one work to another according to the idea and the “mediator” material through which the idea was to be crystallized.

### Defining the term “Sustainability”

- Sustainability: is an environmental term that describes how biological systems remain diverse and productive over time (Wikipedia 2021)<sup>2</sup>.
- Sustainability: achieving compatibility between man, society and his environment by linking three basic elements: efficient use of resources, optimal handling of the prevailing climatic and geographical conditions, and response to the prevailing human, material, and social needs, while preserving the rights of future generations.

**Sustainability Principles:** The application of sustainability in any biological environment depends on four principles, which are:

A- **The scope of sustainability:** It is the field or society in which sustainability is applied, and its existence is usually linked to a set of social, economic, and environmental factors that together form the full support for the scope of sustainability with all its components.  
Consumption: It is the rate of utilization of natural ingredients that constitute an important

catalyst for the sustainability of the life of living creatures, and the higher the rate of consumption, the more this leads to the maintenance of life sustainability, and vice versa.

**B- Resources:** They are all natural and industrial resources that contribute to supporting the scope of sustainability to play its role, when the resources are sufficient and appropriate for the number of living creatures, this leads to maintaining the sustainability of their lives for the longest possible time.

**C- Technology:** It is the modern scientific influence on the nature of life that leads to its development. When technology is used in a correct manner, it leads to maintaining sustainability by providing a set of modern scientific discoveries in various fields.

**D- Sustainability Scale:** It is the tool that uses a set of numerical measures, which contribute to managing the components of sustainability by relying on an understanding of human knowledge. The Sustainability Scale measures the nature of sustainability in various forms of life by providing a set of vital indicators, which provides accurate measurements that help in applying many vital studies related to the concept of sustainability.

Sustainability Objectives provide a set of solutions to maintain global food ratios. Reducing poverty rates, and trying to find alternative ways to treat economic crises that provide equal financial shares for individuals. Ensuring the provision of inclusive and adequate education that maintains sustainability, through the emergence of new studies that provide ideas for adequate support for sustainability. Taking advantage of natural and industrial energy sources to provide materials based on them at reasonable prices, and within the financial capabilities of people. Ensuring the provision of a health sector capable of reducing the spread of diseases, and providing appropriate treatments to reduce global health crises (Khidir 2020)<sup>3</sup>.

Through the four principles of the application of sustainability, which are "Sustainability Scope - Resources - Technology - Sustainability Scale", the research presents how the sculptor deals with these principles to achieve his presence as an active element in that ecosystem through his sculptural work, which in turn carries an aesthetic message and a utilitarian goal in line with the general goal of sustainability, which all efforts have been united to achieve it, and it is given that the sculptural work is affected by the data around it, such as the environment with its resources, society with its thought and trends, and the age with its technology, and here the research presents the impact of sustainability on design in sculptural works, and from that the research presents the definition of design, even if previous studies have known it and its definitions have been covered by many books and literature, but it is necessary to present it here to complement the rationale of presenting the topic in which this research is concerned with.

## **Definition of Design**

Design in its absolute meaning is a basic human work. Whenever we do something for a specific purpose, we are actually designing. This means that most of what we do includes some design, such as keeping books, or photographing pictures.

Design in a special definition is adding something new, and the innovation process is what adds this increase, and on this we have the following definition: "The design process means creative work that achieves its purpose" (Scott 2006 AD)<sup>4</sup>.

### **Design Concept in Applied Sculpture:**

Design in the plastic arts means creating something that has a utilitarian function by organizing and coordinating a group of internal elements and parts in an articulate form for the product and in harmony that combines the aesthetic, taste, and utilitarian aspect at the same time. That is, it is an innovative idea for the artist that produces a design that achieves its purpose (Ismail 1999).

After the research presented the definition of design, and it was presented in various fields, the research here takes that it is a basic layout for making an object or a system, and it is a name used to develop a plan whose final result will be the shape of the product, that is, the use of the material is singular plasticity within an unfamiliar framework that achieves the material and moral purpose through three stages: imagination, idea, and application.

### **Second: Sculptures that were produced within the framework of a sustainable environment:**

The research exposes some works, and the works are divided into three types, which are as follows: -

1- Works implemented through the use of natural environment materials, which are sustainable and environmentally friendly:

Here, a number of sculptural and executed works of plants are presented, which is known as Mosaiculture, through which sculptural works of living plants are embodied, which are characterized by the sustainability of greenery throughout the year, and are distinguished by their colors and shades of their flowers, and sometimes annual plants are used, all of which are used to make sculptural formations that mimic living nature of birds, fish and animals (Ksorich 2020)<sup>5</sup>.



**A Sculpture of a woman with birds**

### **The effect of natural material on the design:**

It is noted that the raw materials of sustainable plants had a clear impact on the design and selection of the sculptures; as most of them came in the form of natural objects from the reality of the surrounding environment. The sculptural works came in the form of human and animal forms, and the material imposed on the designer to use color as an element of formation in the sculptural work, which was not known to stone, wood, and metal carvings before.

2- Works made through the use of waste and previously used materials, and transforming them into aesthetic forms: Robert Bradford created these life-size sculptures of humans and animals from discarded plastic elements, especially toys, as well as pieces and other colored plastic parts, such as combs, buttons, brushes, and parts of clips clothing. In 2002, he began to consider

his children's forgotten toys as part of something bigger that he could use later (Murdoch·Stuart 2021)<sup>6</sup>.



Subod Gupta (VEGA 2021)<sup>7</sup>

Giant skull made from recycled kitchen utensils. The statue was made by an Indian artist

### The Effect of the Material on the Design:

From what was previously presented, the impact of the materials used on the design and selection of subjects for sculptural works is noted; as they came in the form of animals, skeletons, and forms of rough texture and scattered ends according to the materials used, whether from dry plants or metal and plastic wastes, which confirms the clear impact on choosing the appropriate design for each material. The design of some of the sculptures came with smooth lines and smooth surfaces that suggest that they are exploited, as it is clear in the fish models, which were carried out from plastic bottles.

3- Works made using contemporary technologies that demonstrate the knowledge of science for the benefit of the environment and society: Floralis Generica is located in Buenos Aires, it is a giant metal flower made of stainless steel and aluminum. The sculpture in this work simulates the movements of a real flower, that is, it opens with rose leaves in the morning and then closes at dusk. The flower itself is 65 feet high and emerges from a circular pool containing water. The flower has not been working for more than 6 years, however, now, after some repairs, it is fully functional. The flower mechanism uses a hydraulic mechanism that operates on photoelectric energy (Jaakko\_Pernu, Argenteart 2021)<sup>8</sup>.



Giant Metal Flower by Eduardo Cataluna

### Nanotechnology and Sustainable Sculpting

The Louisiana Museum of Modern Art has invited Danish Architecture Firm 3XN to design a pavilion that demonstrates cutting-edge capabilities within smart, sustainable materials. The result is a suite built of dynamic vehicles with integrated intelligence that creates a dynamic interaction with its physical surroundings and its users. The pavilion is called "Learning from Nature" and everything about the pavilion is literally inspired by nature itself: the biological cycle of nature is the fundamental basis of the shape, the materials, and the dynamic energy

generation. Self-cleaning surfaces, phase-changing materials, and built-in sensors that generate energy from visitors' footsteps. It unites advanced technologies and smart materials in a preview of an innovative design. The wing is shaped to symbolize the biological cycle. The construction properties are similar to those of nature - for example, the pavilion has a coating of nanoparticles that help clean surfaces and clean the air. Additionally, the pavilion is built from biodegradable materials. As for energy, the pavilion is 100 percent self-sufficient. The research presents an example model of a smart sculpture in that museum "Learning from Nature" (Learning from Nature with 3XN 2021)<sup>9</sup>.

### **Third: Design Criteria related to the Direction of Sustainability:**

Through the presentation of three styles that the contemporary sculptor deals with to design and implement his sculptures, the first of which is the style of using live plants and flowers, the effect is clear on the design and selection of subjects, all of which came in the form of birds and animals characterized by soft lines and colorful surfaces. In the second pattern, which is the sculptor's use of waste and spent materials, it is noted that all the sculptures came in designs characterized by roughness and sometimes sharp lines and soft ones according to the material used. In the third pattern, in which the sculptor used raw materials treated with techniques such as nano, and others that are weighted to resist climate factors, and others of painted metal and plastics, which would preserve the environment, whether they do not release odors and do not interact with atmospheric factors, and others are environmentally friendly, energy-saving and operate on solar energy that are designed with large areas to make the most of exposure to the sun to store energy. All of this had an impact on choosing the shape of the design to suit the place in which the sculpture was to be placed. The designs kept pace with the spirit of the place and the era with its contemporary techniques, and we cannot therefore overlook the role of material and how to use it as a key player in solving the design problem and the success of the formal and functional formulation of the sculptural work. From here we can derive the design criteria that sustainable materials impose on the design.

**Design Standards:** They are a set of rules that must be followed and observed in the design and implementation phase as a guide for the designer to reach the original design goal and achieve the desired function.

- The importance of these standards appears when choosing the appropriate materials for the design according to the functional, environmental, and aesthetic suitability.
- These standards vary according to the existing local conditions (curriculum - economies - prevailing culture – etc.). From here, it is possible to derive some considerations for the **design standards** to be taken into consideration and followed when carrying out the design process:

**Fixed Design Standards** related to the nature of the sculpture work, its function, and its location: there are safety factors that should be taken into consideration and the use of a material that is not harmful to the surrounding environment and related to the local climatic and geographical conditions, and taking into consideration the dimensions and proportions and the extent of their relationship to the ergonomic measurements of the interaction between the work and the recipient or what he performs.

**Non-Fixed or Changeable Design Standards:** that are characterized by flexibility and subjected to development and modification, such as sensory considerations that affect the sense

of aesthetic reality of the recipient from color or tactile effects, and intellectual considerations of the cultural and civilizational environment appropriate to the design and its required function, taking into consideration the aesthetic taste of the functional sculptural form. The symbolic considerations and their impact on the recipient's acceptance of the work form and finally the environmental considerations cannot be overlooked; as the design links the taster with the surrounding environment and his interaction with it and determines the elements of links between the work and the environment around it.

- Since there is interdependence and integration between all these design standards, they can be divided into the following types:

**Economic Standards:** These are often specific to the material, which is the design's way out into reality. This type of standards consists in taking into consideration the costs involved in the production of the sculpture.

**Aesthetic Standards:** These are specific to the plastic and aesthetic features that must be provided by the design for the ease of acceptance by the recipient, other than what offends the visual impression.

**Human Standards:** These are specific to the functional needs of the sculptural design, whether it is to express a particular philosophy or perform an actual function, and here it is necessary to perform its function easily and comfortably.

#### **Fourth: Results and Recommendations:**

##### **Results:**

- 1- This trend, as a contemporary sculptural plastic trend, did not reach this level without an intellectual support that confirms its orientations, originality, and solidity of its premises, and it is to which its artistic production is subjected and weighs the weight of the plastic experience.
- 2- The new characteristics and features of the unconventional material that aroused the sculptor's thought and resulted in new directions in which the energies of thought and the capabilities of the material and the function of the sculptural work were both invested.
- 3- The material has a clear impact on the choice of design in sustainable sculptural work.
- 4- Understand and take into consideration design standards when using the concept of sustainability and its requirements; as there are unprecedented functional and aesthetic solutions for sculptural work.

##### **Recommendations:**

- 1- The researcher recommends working on providing many references and periodicals in the field of sustainable development.
- 2- The necessity of introducing and teaching the students studying the field of sculpture on the technology and materials developed in this field in order to expand the perceptions and absorb the advanced thought and the global directions for sustainability.
- 3- Working on developing the concept of applied sculpture and applying international standards of sustainability in local projects.

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