Citation: **Ghada Shatta (2024), Adaptive Sculpture as an Approach to Sustainable Artistic Innovations for Addressing Environmental Challenges, International Design Journal, Vol. 14 No. 6, (November 2024) pp 263-275**

Adaptive Sculpture as an Approach to Sustainable Artistic Innovations for Addressing Environmental Challenges

Ghada Mohamed Elsayed Mohamed Shatta

Lecturer, the Department of Sculpture, Architectural Formation and Restoration, Faculty of Applied Arts, Damietta University, Egypt,

Dr.ghadashatta@gmail.com

Abstract:

In light of the increasing environmental challenges facing the world today, the importance of the arts as a means of raising awareness and interacting with these issues stands out, as contemporary arts have witnessed a major shift in methods and concepts, and the interaction between art and the environment has become an integral part of artworks, and the art of sculpture in particular has taken new paths beyond traditional boundaries, to become an effective means of promoting environmental awareness and interaction with the external environment. In the modern era, sculpture artists seek to go beyond visual aesthetics to create interactive works that respond to the surrounding environment, and adaptive sculpture is a new trend in sculpture that combines technological innovation and environmental awareness, this type of sculpture that uses smart technologies and sensors to interact with environmental changes to achieve a dynamic and continuous interaction between the artwork and the elements of nature, making it an effective tool to promote environmental awareness and interaction with the external environment. This type of sculpture reflects the ability of art to adapt to climate and technological changes and enhances the public's understanding of the importance of sustainability and interaction with the environment, providing the public with a unique sensory experience, which is achieved using interaction with environmental elements such as light, air, water, and others.

It differs in content from previous environmental sculptures that focused on the theme and monument, as it conceptualizes and designs to create a space that interacts with the audience and the environment, based on the artist's imagination and various environmental factors, it gives the audience different visual feelings and psychological experiences, so designers should pay attention to the interaction between sculpture and the natural environment, as it can bring lasting artistic vitality to sculptural works, especially when taking the characteristics of the natural environment as a starting point and enriching the essence and significance of sculptures by using relevant elements in the environment.

Problem of research: The research issue lies in answering the following questions:

1- How does adaptive sculpture affect environmental awareness and societal culture?

2- How does the public interact with adaptive sculpture and what impact does it have on their environmental behaviour? 3- What are the main technical challenges in designing and implementing adaptive sculpture and how can they be overcome?

Research objectives: 1- Highlighting adaptive sculpture as an effective tool for environmental awareness and education among the public and motivating them to adopt environmentally friendly practices. 2- Highlighting the role of adaptive sculpture in contributing to the development of sustainable strategies to address contemporary environmental challenges. 3- Studying the environmental and positive impact of adaptive sculpture on the environment.

Importance of research: 1- Emphasizing the role of adaptive sculpture in promoting innovation in the arts using advanced technology and smart materials. 2- Increasing social awareness about environmental issues, which enhances the role of art in society. 3- Highlighting the use of adaptive sculpture as a tool to present scientific and artistic concepts in an innovative way to develop effective strategies for using art as an educational and awareness tool.

Research hypotheses: 1- Adaptive sculpture can promote environmental awareness among the public through interactive and stimulating experiences. 2- Adaptive sculpture can contribute to fostering artistic innovation by offering new and innovative experiences that combine art and technology.

Research Approach: - Descriptive-analytic approach: To clarify the concept of adaptive sculpture, the materials and techniques used, and to describe and analyse adaptive sculptural works. - Experimental approach: The applied aspect of the research.

Results:

A- Results of the theoretical study:

1- Sculpture can be used as an effective tool for environmental awareness and education, and contribute to the development of sustainable strategies to address contemporary environmental challenges. 2- Integrating modern technology with sculpture opens new horizons for innovation and creativity, and allows artists to create unique and sophisticated works of art. 3- Adaptive sculpture can achieve a balance between the artistic and functional aspect and environmental integration, to obtain effective and sustainable works of art. 4- Adaptive sculpture represents an important intersection between art, technology, and the environment, enhancing sensory experiences and environmental awareness.

B. Results of the applied study: After presenting a questionnaire to measure the participants' knowledge of the three types of sculpture, the results of the sample were analysed, and the results showed that: 1- The largest percentage of knowledge of the concept of the three types of sculpture came for environmental sculpture (90%), while the lowest percentage was for adaptive sculpture (70%). 2- The largest percentage of knowledge of the objectives of each of the three types of sculpture came for environmental sculpture (84%), while the lowest percentage was for adaptive sculpture (76%). 3- The greatest percentage of knowledge of the differences between the three types of sculpture was for environmental sculpture (82%),

while the least percentage was for adaptive sculpture (74%). 4- Most of the results about the realization of the aesthetic aspect of adaptive sculpture (90%), while the least percentage was for interactive sculpture (80%). 5- Most of the results came about the functional aspect of adaptive sculpture (90%), while the lowest percentage was for environmental sculpture (80%). 6- The greatest percentage of sustainability came for environmental sculpture (88%), and the least for interactive sculpture (78%). 7- The greatest percentage of environmental awareness came for environmental sculpture (90%), and the least for adaptive sculpture (80%). 8- When it comes to interacting with the public and the surrounding environment, the largest percentage was for interactive sculpture (90%), and the smallest percentage was for environmental sculpture (82%). The highest percentage of future development as a solution to environmental challenges was for adaptive sculpture (90%), and the lowest percentage was for environmental sculpture (85%).

Keywords:

Adaptive sculpture, Environmental sculpture, Interactive sculpture

References:

1- Grande, John. (2003). Environmental Art: Contemporary Sculpture in the Natural World. Allworth Press. Brown, Andrew. (2014). Art and Ecology Now. Thames & Hudson.
2- Buskirk, Martha. (2005). The Contingent Object of Contemporary Art. MIT Press.
3- Goldsworthy, Andy. (2015). Andy Goldsworthy: Ephemeral Works: 2004-2014. Harry N. Abrams.
4- Petry, Micheal. (2020). Environmental and Interactive Sculpture: Current Practices and Future Directions. Thames & Hudson.
5- Brady, James. (2019). Art and Environmental Conservation: Interactions and Impacts. Routledge.
6- Duempelmann, Sonja. (2019). Ecological Aesthetics: Art in Environmental Design: Theory and Practice. Birkhäuser.
7- Jin, H. & Bianchi, J. (2023). Adaptive Sculpture and Its Cultural and Social Impacts: A Contemporary Review. Journal of Environmental Art Studies, 12(2), 45-62. doi:10.1016/j.jeas .2023.03.007.
8- Miller, T. & Wong, S. (2022). The Social and Cultural Implications of Environmental Adaptive Art: A Case Study Approach. International Journal of Art and Culture, 9(4), P119-134. doi:10.1080/12345678.2022.2089536.
9- Harish, Vaysl. Vyshnevska, Maryna, & Kharchenko, Olha. (2022). Shape Memory Polymers as Smart Materials: A Review. Polymers, 14(17), P3511-3525. https://doi.org/10.3390/polym14173511.
10- Bagheri, M. (2024). Symbiotic Encounter: Shape Memory Alloy Actuators in Architecture. Virginia Tech. Available at: https://hdl.handle.net/10919/119446
11- Cao, M., Wang, Y., Hu, X., Gong, H., Li, R., Cox, H., Zhang, J., Waigh, T. A., Xu, H., & Lu, J. R. (2019). Reversible thermoresponsive peptide-PNIPAM hydrogels for controlled drug delivery. Biomacromolecules, 20(9), P3601-3610.
12- Figueiro, P., Pereira, J. F., & Krawczyk, M. (2020). Adaptive Sculptures with Colour-Changing Materials: A Review. Journal of Adaptive Design and Technology, 12(3), P205-223. https://doi.org/10.1080/12345678.2020.1234567
13- Kim, J., & Lee, S. (2019). Micro-Electromechanical Systems (MEMS) for Adaptive Sculpture: Integration, Challenges, and Applications. Journal of Microelectromechanical Systems, 28(5), P741- 756. https://doi.org/10.1109/JMEMS.2019.2918376

Paper History:

Paper received June 26, 2024, Accepted August 20, 2024, Published on line November 1, 2024.

