



Alexandria University  
Faculty of Fine Arts  
Décor Department  
Specialization of Interior Architecture

## **Modern Environmental technological techniques in the formulation and design of floating interior spaces**

**A Thesis introduced to the Décor Department  
To the Requirement of Phd Degree in Fine Arts  
Décor Department -Specialization Interior Architecture**

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## Thesis Summary

Internal architecture seeks to find the best solutions to societal problems and environmental problems facing society, whether those problems are tangible or intangible, such as (increasing population numbers and other environmental problems, "global warming, increasing the rate of snowfall in the Arctic) and seeking to provide internal spaces in a proportionate manner. With the advancement of technology and accordingly, floating architecture appeared to overcome these problems

- Floating architecture has become an alternative to traditional architecture, as it is expected that a major change in the climate will occur in the coming periods, and this will affect many coastal countries as a result of high water levels and an increase in global warming that leads to melting ice in the Arctic. This will lead to a decline in inhabited areas. In coastal areas, therefore, the idea of floating architecture and floating above the water is the best solution to address these problems and for this, it needs more research and study.
- Hence, the research deals with the study of floating spreads of all kinds as future spaces that have special features in order to reach appropriate design treatments for those spreads and their role in overcoming environmental and social problems and the effect of both modern design trends and technological techniques in designing those spaces to meet their functional requirements with an emphasis on Study the construction and implementation methods, the external environment and the environmental changes affecting them, and study the design requirements and directions in order to create self-adaptive floating internal spaces related to the external environment. This has been reviewed through five chapters as follows:

### • Chapter One: What is floating architecture and its stages of development

Through this chapter, we talked about the concept of floating architecture and its development stages in the countries of the world, where we study the floating areas in Asian and European countries and their stages of development through the ages, and identify the problems and risks that these floating units faced in that ages to reach the current form of floating architecture

So the architecture in the first chapter dealt with the importance of floating architecture as it is an example to overcome the climatic and environmental



problems which are represented in (global warming - melting ice from the Arctic - rising sea level)

The presentation covered the basic principles and concepts of the design process in floating units Which is summarized in (ease of access - float system - anchorage pillars - construction materials - foundations materials - site organization units - minimum water depth - safety and security requirements - fire fighting equipment - barriers and handrails - anti-slip surfaces)

The problems and advantages faced by floating units were identified

#### • Then the second chapter: Influencing factors the design process of floating units

Through this chapter, the classifications of these units have been studied, and the designer must be familiar with those classifications of the floating units in order to be able to achieve the desired purpose of those units.

Then a review was made of the impact of the external architectural determinants on the design of the floating units. When studying the design of the floating units, it is necessary at the outset to know the external architectural determinants because they are the boundaries that separate the unit from the external environment

And studying the impact of these limitations on the interior design of the units. The technical equipment of the floating units is of a special nature due to the surrounding environmental conditions. This is the work of the interior architecture designers to combine modern technological techniques, environmental treatments and advanced materials in order to reach contemporary design solutions for those spaces and Achieving the desired goal for those spaces (electrical systems - ventilation and cooling - water network - drainage and nutrition - safety and security requirements

#### • Then the third chapter: Contemporary design treatments and their impact on the design of floating units

Through this chapter, we shed light on the internal space of the floating units, which is a space with a new vision established to achieve maximum benefit from the water bodies, which represent 75% of the Earth's area, using advanced technology techniques

And that space needs different design criteria due to its situation and the surrounding conditions. All aspects and design criteria must be studied and ensure that the needs of the users of those spaces are met.

The design considerations of the floating units have been studied, which are divided into (environmental considerations - design considerations - human considerations - economic considerations - legal considerations).

The induction is left to the study of lighting systems and their impact on the interior design of the floating units and the new methods used to achieve natural lighting, as well as the effect of color on the interior design.

Then study the impact of raw materials technology on the interior design of the internal spaces of the floating units, where the raw materials were divided into (natural raw materials - industrial raw materials - mixed ores - recycled materials) and studying the effect of each of them on the floating units

#### **Then, the fourth chapter, The effect of new environmental technologies on the design of floating units**

In this chapter, the structures of the floating buildings were identified. The floating spaces are divided into several types to adapt to the topographical and geographical conditions. The floating spaces are divided into several types according to their location in relation to the water. Half of it is under water, the rest of it is above the water, and finally completely submerged under the surface of the water

Then he dealt with the study of sustainable interior design. This term refers to the application of sustainable architecture strategies and mechanisms that achieve the psychological and physiological needs and requirements of the individual without causing any damage to the internal environment or the surrounding environment. This requires dealing with internal spaces in an environmental way in order to achieve quality in terms of environmental performance. And social and economic



Floating units can provide sustainable design concepts in architecture which are summarized as: promoting renewable energy generation, accessibility, reuse, recycling, and self-support

Then he studied the impact of raw materials technology on the interior design of the floating units:

Environmental design faces many challenges from an aesthetic point of view, as it works on understanding and responding to the requirements of the environment and the user, with the flexibility of adapting to the technology of the times and the new developments in it.

**• Finally, Chapter Five: Applications on the effect of modern technologies in the division of open interior spaces**

Through what has been previously studied, all the information that helps in developing a proposed conception for the design of a marine service center in the new city of El Alamein has been collected.

Where the identification of the construction method and the floating rules that preserve the integrity of the building, and the building was designed so that it has the ability to provide energies and achieve self-sufficiency, taking advantage of the solar energies and the energy of the waves surrounding the building.

As well as studying the interior design of the dakhila spaces, which is based on the use of environmentally friendly services and recycled materials.