Influence of Modern Design Trends in Interior Architecture Studio Biophilic Design Styles in Office Space

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ABSTRACT

Design of interior architecture has a direct relationship with improving the individual's feelings and the standard of his/her performance together with the way of interaction with others within the space. These days, there is a global necessity for space design that inspires, energizes and supports employees. Researches proved that working within a space that has a sustained design that is linked with natural elements positively affects the physical and psychological well-being of employees.

The research problem is represented in the lack of knowledge of junior designers (students) regarding design elements and characteristics of interior spaces that revitalize health and enhance work efficiency within administrative offices. To solve the problem, the research presented three modern design trends: Biophilic, Biomimicry and geometric in the design studio of the proposed project titled "administrative office specialized in architecture design, interior design … etc." providing broader scope of choices for students, specifying that the sustainable Biophilic design of interior office space fulfills health revitalization characteristics and supports students in design stages as a rich source for styles of design elements providing them with ideas of production diversity, creativity and innovation together with learning and implementing Biophilic design characteristics which provide sustainable work environments using nature elements that help to promote the psychological and physical wellbeing of workers and in the same time reduces individual's stress and enhances work efficiency. The research relied on measuring the effect of Biophilic styles and modern trends on the process of designing for students of the subject of interior architecture (AR416) which is taught to the students of the Arab Academy for Science, Technology and Maritime Transport in the spring semester 2019-2020. Students' analysis of the experiments was analyzed. The sample consisted of 95 students (55 females and 40 males) in the level of grade eight where the researcher has been teaching this curriculum as a lecturer professor since 2012 till present.

1- Introduction:

Interior architectural design if considered as a human and creative field that interacts with elements and terms of interior design with the space. The interior architectural designer tries, all the time, to negotiate design solutions in an attempt to come up with the ideal space. Biophilic design seeks to connect man with nature in the building space. Researches, such this one, support the idea of inserting nature into the interior space of buildings. Unfortunately, the availability of detailed instructions regarding this concept is pretty limited. This paper, shows the way the student sees different styles of biophilia and how it could be blended in the interior architectural design of an administrative office. This study utilized systematic development, testing, and more research knowledge and experience of bio design. Human physiological

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health is influenced by scenes of landscape and positive inspiration through its effect on man's psychology. This is represented by the possibility of providing this kind of communication between man and natural surroundings such as gardens and landscapes. This positive effect of seeing such scenes, together with the visual and sensory communication and keeping in touch with the outside environment helps the individual to unconsciously get away from problems and stress in the used space. Consequently, Biophilia suggests a comprehensive framework to satisfy the nature experiment within architecture space that renders a positive effect on the psychological state of space user (e.g. increasing concentration, stimulation, tranquility … etc.). (Kellert, 2008).

Man's need for nature is an innate need to communicate with nature's elements and systems or what became known as vital love (Wilson 1984). Positive physical and mental effects arise when characteristics of nature are blended into our daily life (Heerwagen & Hase, 2001, Kan, 1997 and Ulrich et al, 2008). As an example, vegetation covered with immigrant birds reduces depression, anxiety and stress, (Cox et al, 2017). In addition to that it enhances spiritual connection with nature and eternal places. (Hoffman, 1992). Therefore, little exposure to nature represents an increasing source of anxiety as communicating with nature provides a variety group of positive effects on physical, psychological and spiritual health, (Berman, M. G. Jonides, J. and Kaplan, S., 2008). While exposure to nature is essential within the interior space, yet there is little done to direct interior architecture design to the use of blending Biophilic design within the architectural space. In the design studio of students of the Arab Academy for Science and Technology and Maritime Transport and during the spring 2019-2020 for the eighth level, three design trends were presented in the studio for the second project (suggested title: interior architecture design office) for opening a wider scope for students (Biophilic, Biomimicry, Geometric). The heist recorded number of students' choices was for the Biophilic trend as the main design trend where 85 students went for it (group 1). Geometric and biomimicry trends as a secondary, subsidiary trend of design elements each on its own (BB-BG). Ten students (group 2) decided on the Geometric trend as the main design rend utilizing Biophilic trend as secondary, subsidiary trend in design. Students' choice for the design trend was based on their vision for rich design criteria for Biophilic trend after listening to the lecture and performing the concentrated research that revealed rich knowledge information and the wide diversity arising from linking nature design elements to interior space and the innovative ideas of implementing such criteria.

Sustainability:

The concept of sustainability means preserving the environment which in its turn provides human sustainability. The purpose of sustainability targets the health, safety and wellbeing of man together with affection the local society and standard of living and aiming to reduce consumption of resources and utilizing recycling of materials. This is beside using renewable resources of materials which do not damage the environment and without consuming the basic resource and conserving energy and using as much as possible renewable energy resources (e.g. solar energy, wind and Biomass … etc.). Fulfilling needs for the present without affecting the ability of coming on generations to fulfill their needs. There are three pillars to sustainability; economic, environmental and social, (WCED, 1987), (McDonoug, 1992). Sustainability could

not be achieved without improving the environment, adapting to natural elements, eliminating toxic substances and reducing pollution.

Biomimicry:

Biomimicry is an applied science that deals with the issues of finding solutions to problems that face mankind through the study of natural designs, processes, and systems of living organisms as the interior architecture uses biology as a source for forms and design bases. Biomimicry describes designs that are inspired by nature to solve problems of man. The design should depend on natural sciences including biology to qualify for consideration as Biomimicry (Jenks, 1971). In another definition, Biomimicry and biological measures are considered to belong to new sciences which monitor materials existing in nature and then aim to produce solutions to problems of man through copying such designs or being inspired by them (Benyas, 1997).

Geometric design concept:

This expression pertains to designs based on utilizing geometric decorative patterns, lines, prints and forms as design tools and design elements for interior architecture which begins with elements and forms and their inter relations. Geometric design can participate in the process through dealing with geometric forms as elements in addition to ratios and angles and inter relations among them (Evans, Robin, 1995). Proportionality within a group of visual elements among different parts of the interior space provides a feeling of balance, organization and diversity (Fazio et al., 2004). The golden section may be considered as the ideal balance ratio that is characterized by having unity and diversity in the same time, (Evans, Robin, 1995). Geometric styles and forms exist within the space in either two-dimension or three-dimension forms as repeated motif patterns in the architectural group. Combining geometric design and color could create visually pleasing contrast. Repeating or rearranging geometric patterns may give the sensation of mobility and could also add streamline feeling to the space. Gauging is the simplest way of achieving either contrast of harmony, (Panovan, 1999).

Biophilia:

Definition of Biophilia in its simplest meaning is "love life". Since the olden ages, man was intuitively aware of it. Natural things, forms and styles were considered as inspiration to architects along ages of history. Definition of Biophilia has been developed by three scientists: Erich Fromm, a psychologist used the term for the first time in 1964. Then a biologist by the name Edward O. Wilson mentioned the term in the eighties of the twentieth century when he showed that modernization led to the disconnection with nature. In 1997 Stephen R. Kellert presented a group of criteria for Biophilic design. Kellert went further to describe the difference between his views and the views of Wilson and Fromm about Biophilia in his book that was published in 1997. Despite of Fromm's description of Biophilia as "love life", whether this love was towards a person or a plant, yet his work, nearly exclusively, concentrated on human reactions. Work of Wilson and Fromm concentrates on people's need to totally communicate with the world of nature and biological diversity, (Kellert, 1997).

2- Importance of the Research:

The studio of interior architecture design is a prime experience that lights the way and explores design trends. The role of the studio is to emphasize the connection between function and creativity and comfort of users of interior space. Universities of to-day work on promoting and supporting innovative ideas which enables the student to come up with design ideas that enhance the intellectual creativity in design. Humans spend 90% of their life inside architectural space. A person continually needs to feel connected and belonging to his/her surroundings. Such needs arise from the feel of the ever-changing nature. While the ecology of man keeps changing, characteristics of buildings stay static. This in itself hinders the coexistence of buildings and their users. Buildings in their traditional form can only provide users with invariable and recurring scenes which negatively affect the individual's mental and physical health and make him bored. Due to the importance of this matter, analysis of students' experiments for subjects taught to was performed. It took place in spring of 2019-2020. The sample consisted of 95 students of AASTMT, (55 females and 45 males) at the level of the eighth class. It spread over seventeen weeks / four hours a week.

3- The research problem:

Recent design directions are of some importance. Despite this, it was noticed that there were some shortcomings in the students' deep studies of design elements and characteristics together with the formation and analysis of such elements for the purpose of fulfilling contemporary functional needs. An important aim of the design studio was to encourage students to explore, analyze and study different trends leading to adhere to tie design elements to nature and to support bio designs, which in turn alleviates stress and enhances functional performance having effect on man's wellbeing.

4- Aim of the study:

The study aims to check how students view modern trends in design and use of Biophilic patterns. Students' attitude in this regard is evaluated. This study begins with explaining modern trends and their relation to nature and bases and elements of interior architecture. Students are to identify the elements and principals of design thinking to open new horizons and to stimulate their creativity and innovation. The professor holds discussions with the students around the way styles, forms and angles are defined. Discussions, also, go around characteristics of each trend. All bases are presented with different examples and ideas of each trend.

Then students can get into stages of research analysis, study, and design to verifying their choices. They then start to solidify their ideas through forming their own design concept. The study was performed through a questionnaire to verify the extent of the effect of Biophilia on students' views.

5- Mechanism of design process and research:

The educational process pertaining to the design of interior architecture provides a through view of the aspects of practice and theoretical tools which are considered to be the essential tools for the designer of interior architecture. Such educational bases provide students with the necessary

skills as a tool needed for dealing with the design. This is where the students' ability to develop and innovate starts. (Wenger, 1998).

The student selects the style, draws his/her ideas, collects data and reviews references. This research paves the way for each student to comprehensively examine selected styles and deeply comprehend design terms and bases of such styles. Students, then, start the comprehensive design process including searching and analyzing visual elements and defining the problem.

A table showing studio methodological stages and mechanism and the student's process of searching and designing during the study weeks. (developed by the researcher)

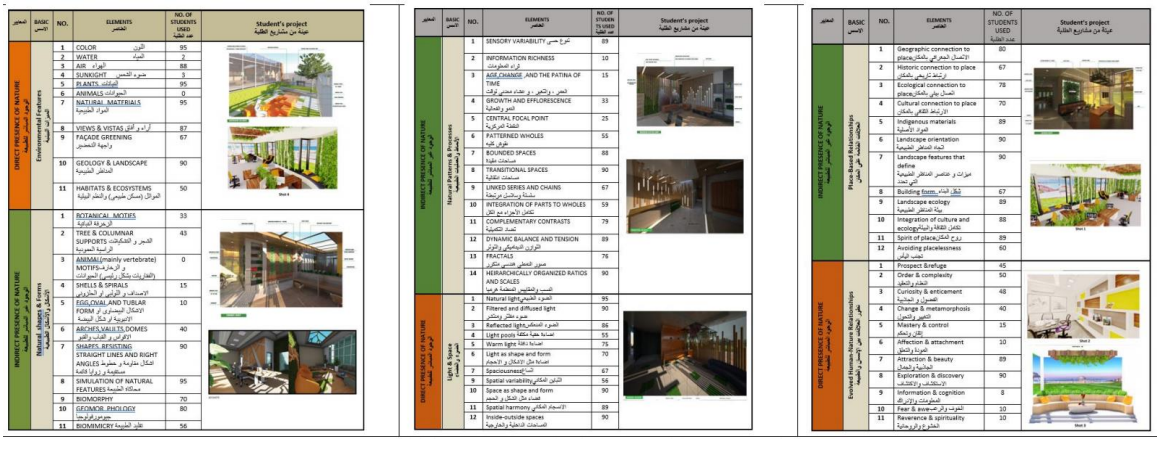
Assimilation الإستيعاب	Week 7 to 10 من الاسبوع 7 الى 10	Introduction to concept and principles مقدمة في المفهوم والمبادئ	
		Research – Analysis البحث - التحليل	Brain Storming – Feedback العصف الذهني - المراجعة
		Concept – Idea – Spaces المفهوم – الفكرة - الحيز	Zoning - Function تقسيم الحيز – تحديد الوظائف
		Discussion – Self Awareness مناقشات – و الادراك الذاتي	First sketch – Layout furniture الرسومات الاولية – المسقط الافقي بالاثاث
		Pre-Design Investigations التصميم المبدئي	Feedback مراجعة
		Exploration - Observation Documentation الاستكشاف – تدوين الملاحظات	Relation between different spaces ربط العلاقات بين الحيزات المختلفة
		Encountering & Interacting التوجيه و التفاعل	Data analysis تحليل البيانات
		Submission تسليم الافكار المطروحة	Standard المقاسات

Design Phase & Analysis مرحلة التصميم والتحليل	Week 8 to 15 من الاسبوع 8 الى 15	Collaborative Discourse & Concept Development الخطاب التعاوني وتطوير المفاهيم	
		CRITICAL ASSESMENT & Recognition of Cultural Differences التقييم النقدي و ادراك الاختلافات الثقافية	
		Design and Documentation التصميم والتوثيق	Work effectively within multidisciplinary team. العمل بفاعلية ضمن فريق متعدد التخصصات.
		Solutions (development-feedback) الحلول و تطوير الفكرة	Feedback مراجعة
		Plan المسقط الافقي	Sections القطاعات
		Sample boards لوحات العينات و الامثلة	مناظير3D
Synthesis الجمع و التركيب	Week 16 & 17 الاسبوع 16 & 17	Design Integration - Design Development & Reflection تكامل التصميم - تطوير التصميم والتفكير	
		Development of Form into Final Scheme تطوير النموذج إلى مخطط نهائي	
		Presentation of Final Scheme عرض المخطط النهائي	

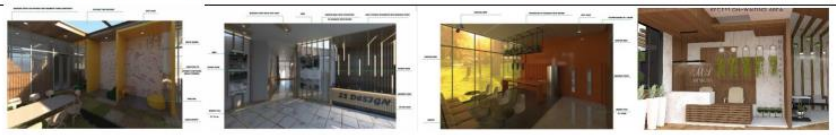
٦ -Research Methodology:

The research was performed on a sample of students of architectural engineering department in the Arab academy for Science, Technology and Maritime Transport, (AASTMT) during spring season of 2019-2020 at the eighth-grade level who study interior architecture design. The sample consisted of 95 students (55 females and 45 males). The program extended to the second project (office) over seventeen weeks / four hours weekly. Students were asked to start searching, analyzing, designing and verifying their different choices. Students adopted different design styles (Biophilic, Biomimicry and Geometric). Elements of each design trend were analyzed (colors, materials, style, floor design, form, illumination, dimensions, rhythms, basic design elements, etc.).

Table showing the relation of number of students and Biophilic design criteria and a sample of students' designs. The extent of students' usage of design criteria and samples of students' projects showing design trend elements in every Biophilic criterion.



A table that shows advantages which characterized each trend with applied image of students' projects.

	Example from Student Projects
Using **Biophilia** as the main trend and **Biomimicry** as a secondary trend. (Group 1)	TREND
- The design idea depends on the input of copying and imitation which includes inspiration from nature. - Using biophilia as a good tool to stimulate the designer's imagination providing more exploration skills. - Combining nature with materials and forms in the design. - Simulating an idea based on abstract principle of geometric repetition and botanic formation. - Blending the landscape as a design element with the interior space leading to bringing nature into the space.	IDEA
	Example from Student Projects
Using **Geometric** design trend as the main trend while using **Biophilia** as an auxiliary or secondary design trend. (Group 2)	TREND
- Forms of geometric and nature innovations have a creative idea and style. - Aims of the project are simply and creatively fulfilled through utilizing a simple shape unit. - Blending both trends helps to come up with a flexible and innovative model design. - Rhythm and repetition among formation elements were inspired by geometric elements.	IDEA
	Example from Student Projects
Using **Biophilia** as the main trend and **Geometric** as a secondary trend. (Group 1)	TREND
The diversity and overlap of visual elements of different scales and various functions correspond to the aesthetic, sensory values of living medicine. - Creating infinite forms to make a relationship between functional needs and nature, developing visual thinking skills, fluency in thinking and flexibility. - Dynamic diffused natural light, stimulating a diverse and innovative design image. - Adopting the blending of natural lighting within the space as a strong design element. -Strengthening the interactive relationship by linking man with nature.	IDEA

7- Results:

The teaching experience of modern trends revealed that there was a state of creativity that emerged in the studio of interior architecture design. It also showed that elements of Biophilic design have a rather positive effect on interior architecture design and its elements which allows students to use different and innovative ideas. Consequently:

1- Acquired different skills of Biophilic criteria resulted in the diversity and innovation of students' designs.

2- Nature is considered to be an everlasting fruitful source of design ideas as elements of Biophilic designs are inspired by multiple elements of nature. Such designs are utilized in applications in the field of interior architecture. Biophilic design is regarded as a rich design trend that adds a new meaning to space designs.

3- Biophilic design is a useful strong trend which has creative thinking characteristics.

4- Principles of Biophilic design have versatile repeatable strategies. They are rich elements which encourage successful ideas. In the design studio, it is important to allocate more time for discussing such elements beside each of the criteria of Biophilic design trend in projects and giving them enough time and importance.

8- Recommendations:

The design studio could be considered as one of the most important sources of knowledge and innovation that can enlighten today's student, tomorrow's engineer. For this reason, the study recommends the following:

1- Integrating basic connection of nature with different trends in design decisions inside the design studio to enhance skills and human experience.

2- Increasing the awareness of interior architects regarding the importance of ecological design and modern contemporary trends and simulating nature (Biomimicry).

3- Taking care of implementing and guiding the design studio, whenever possible, regarding Biomimicry in the field of architecture and interior architecture.

4- Supporting research and studies which encourage preservation of natural environment.

5- Encouraging the teaching of modern trends which has positive effect on man in the design studio.

6- Allocating longer periods of time for discussing criteria and elements of Biophilic design in the design studio.

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