

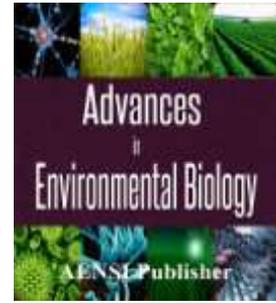


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The adoption of flexibility mechanism in the creation of simple interior space

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ABSTRACT

The era of technological development adds new characteristics to interior design towards the development of living and working spaces. Flexibility characteristic is one of these new add. There are many types of flexibility according to the level of use. Interior design environment for small spaces is a new generation of interior design strategy. The idea of how willing to live within the limited space is an important problem faced by most of the users in how to furnish it to achieve uses economical, functional, and aesthetic needs. Identifying the role of interior design strategies is important for addressing those needs. There are important elements of design have special contribute to the optimal exploitation of compact interior space to reach users' needs. The main elements of design can be used to achieve human needs are flexibility and simplicity as a main mechanism to generate interior space, in order to achieve the requirements of function and design to be adapted successfully to the modern requirements of users. This leads to the exploitation of small areas with largest human benefits.

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INTRODUCTION

Architectural and interior design in all its branches, considered the language of humanitarian dialogue among different cultures. It has a real and influential role in the evolution of human life and the spaces that surround humans. The present era has many contemporary effects as a resulted of technological development in several directions like an evolution of technology production elements of interior design, which in turn is linked to the designing process. The technological advancement figured many of life's problems, including area exploitation problems to meet the specific function effectively [1]. Decreased living, movement, and working space are the main results of the economic value effects. Moreover, designers nowadays try to exploit the commercial and residential space effectively, especially in city centre areas, which have population densities. Designers are going to use the characteristics of design and materials to create space with flexible properties can adapt with functional needs to exploit space increased by about 300% in addition to aesthetic purposes [2]. Flexibility is the most important strategies adopted in the interior design processes, to achieve users' needs by effective supporting from technological, industrial, and generating shape strategy development.

Flexibility term can be found in three main levels: 1 -overall design level. (The nature of the design space); 2- design element level. (Generating Space items); 3- details of design level. (Furniture and decorative details) [3].

These levels are associated with each other, designers can create a kind of flexibility between details and design element levels. The process of generating elements was found in two cases to reach flexibility:

- Shape: shape can be generated by using principles of design. Symmetry, balance, repetition, and shape transformation researchers pointed that these principles are the most useful generating tools which designers can adopt on to create space, that contained enough flexibility value to achieve user's physical and psychological requirements.

- Volume: size, length, width, and height have an effective role in the process of adaption and comfort users with space, flexibility of changing the volume of spaces helps to have an interactive space [1].

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Flexibility is the way to achieve new designing solutions to reach aesthetic and functional results from designing small area. Flexibility is physical characteristic of materials and shape in the interior design process, which means, designers can use geometrical characteristic in order to gain a flexible space, which adapting with function, aesthetic, and economic needs in this era. Designers can generate flexible limited space, like retail space, depending on interior design principles to achieve functional and aesthetic needs, which is important for evaluating comfort value for users with space [2].

Methodology:

This study attempts to review existing literature on interior design principles that related to generating flexible space, flexible factors, aesthetic value. In this paper the Mobley model (1977), and a theoretical framework identifying the relationships among aesthetic, simplicity, and flexibility. For more subjective purposes, literatures will be discussed to find out the effective variables on the flexibility value of interior space. This paper used secondary data from published journals within architecture interior design. Moreover, some published about furniture [4]. From previous literatures, the main elements of design flexible and simple space, which can reach the functional and aesthetic needs. This study is for marking these elements in two levels of variables, main level, and secondary level. To make it more clarity for designers and to be easily applying to design small area that carrying flexible and simple properties in order to achieve the psychological and functional comfort value for users with small space.

Simplicity via Flexibility:

Simplicity in design can be a result of flexibility which is intended or not. Flexibility is the most important requirements for designing spaces that depends on principles of simplicity in design. The simplicity in this research is not minimalism in elements of design, simplicity is how to design a space that meets functional and aesthetic need, which used simple mechanism to create request form and space [5]. Simplicity mechanism associated with the architectural design principles in general. Generating shape mechanism which depends on simplicity deals with two stages of variables, which are: main level and secondary level. Each variable has related secondary variable, which linked to another main variable. The main variable that reflects principles of design:

(i) Symmetry:

Symmetry affects on the regularity of the shape. Symmetrical shape is the shape that contained parts with a systematic relationship, which is stable in nature because it is symmetrical about one or more axis. Asymmetric shapes are irregular shapes that its parts are not similar and balanced. Complexity and simplicity of the shapes can be measured depending on the symmetry. Moreover, find a random value of shape depends on symmetry also [6]. Symmetry is an important factor and value for harmonizing architecture, where it is a measure of harmony architect. It is used in certain limits, to describe the similarity value state of the form. Symmetry has an important role in generating shape rules and formation in interior design and architecture. Four main types of symmetry, namely [7]: Rotational Symmetry (Fig. 1-a), Reflection Symmetry (Fig. 1-b), Transformation Symmetry (Fig. 1-c), and Algebraic symmetry (Fig. 1-d).

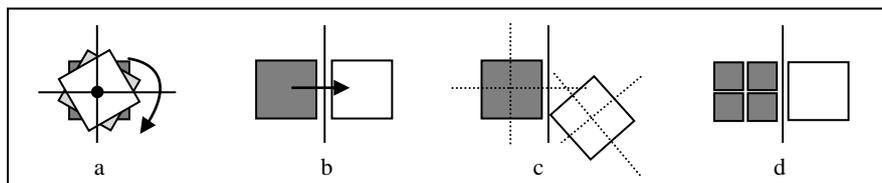


Fig. 1: Symmetry types.

(ii) Repetition:

Repetition is one of the important geometric properties that used to create flexible shape depending on simplicity [1]. Repetition can be used according to availability of repetition conditions, object and path. There are varying types of repetition according to designers' purposes, functional needs, and aesthetic achievement. Researchers classified repetitions according to its types, relations, and direction. Three types of repetition depending on the rhythm [7]: Normal repetition (Fig. 2-a), Rhythmic repetition (Fig. 2-b), and Transformation repetition (Fig. 2-c).

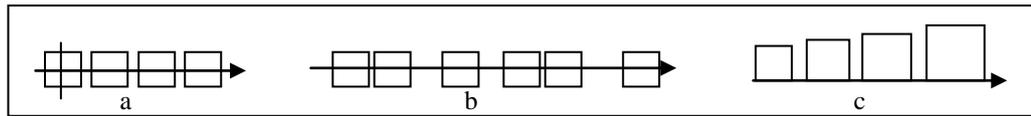


Fig. 2: Repetition types.

Three types of adjacency relations can be found in repetition [7]: Tangent (Fig. 3-a), Overlap (Fig. 3-b), Separate (Fig. 3-c).

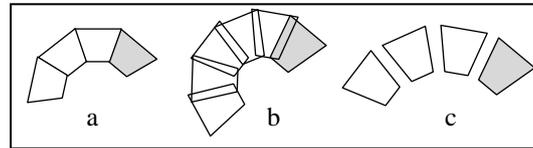


Fig. 3: Adjacency relations types.

Three types of repetition directions [7]: Linear (Fig. 4-a), Gridiron (Fig. 4-b), Radiate (Fig. 4-c), Central (Fig. 4-d).

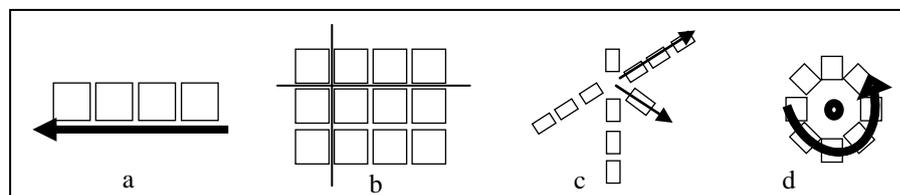


Fig. 4: Repetition directions types.

(iii) Shape transformation:

Shapes transformation element associated with flexibility dramatically. Changing shape is one of flexibility properties. Design small interior spaces must rely on elements shapes transformation, to be interactive with the function and shape. In each case a special kind of flexibility to transform shape, there are three main types [2]: Change shape and function, Change shape with the same function, Hide shape and function, Hide shape and change function, Flexibility arrangement. Transformation mechanisms, which used to change form and function of an interior design elements and give the flexibility characteristic to design are: Contraction and extension, Folding, Compressive and tensile, Move around an axis (rotation), Moving along axes (sliding).

RESULTS AND DISCUSSION

Users can adapt with space when it reached uses' psychical and function needs. From previous studies secondary data, which identified the most important elements to achieve flexibility and simplicity, designers can use these elements as a manual to apply flexible properties within a small space like shops and retails to reflect the aesthetic of interior design by simple strategies. Three main elements were marked by researchers, Symmetry, Repetition, and shape transformations. These generative elements have different types. There are a real overlap among elements, and secondary variables. Designers can't depend on the symmetry without taking some value from repetition or transformation sub-element. As literatures illustrated, symmetry has four types, Rotational Symmetry, Reflection Symmetry, Transformation Symmetry, Algebraic symmetry. To reach these types, there are important generating element, axis, centre point, and objects. Repetitions direction types are overlapped with symmetry, like Linear, Gridiron, Radiate, Central. As results, flexibility associated with simplicity by generating shape elements, which considered the transformation point of interior space to make users adapted to it. Flexibility is used in three levels, interior design element (wall, partitions, ..etc) and interior design details. There are mixmode case between the two levels. And same for flexibility by transformation mechanisms.

Summary:

The principles of interior design can be used in a simple way to achieve flexibility in small spaces. Symmetry, Repetition, and Shape transformation are the general rules of creating simplicity and flexibility term in space according to users' needs and to reach aesthetic of design. Each of these rules has different types and ways to use. By this study, three types of mechanisms are identified to generate interior space containing, aesthetic value, comfortable, and simplicity value supported by flexibility. First mechanism is used symmetry with shape transformation, second one uses repetition with shape transformation, and third mechanism uses all three rules. Secondary values for main rules aren't useful to use it all, there are some value make space compact ,

ugly and uncomfortable. Not all types of flexibility are perfect to use. Space must be interactive with function and users. As a conclusion, table 1 explained the useful rules and secondary values.

Table 1: Effective elements and relations for creating flexibility and simplicity in comfortable ID

Main Rules	Secondary	Value	
Symmetry	Types	Reflection Symmetry	
		Transformation Symmetry	
		Algebraic symmetry	
Repetition	Types	Normal repetition	
		Transformation repetition	
	Adjacency types	Tangent	
		Separate	
	Direction types	Linear	
		Gridiron	
		Radiate	
Shape Transformation	Types	Change shape and function of element	
		Change shape with same function of element	
		Hide shape and change function of element	
		Arrangement	
	Mechanism types	Contraction and extension	
		Folding	
		Compressive and tensile	
		Move around an axis (rotation).	
		Move along axes (sliding)	

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