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Providing a new health-oriented design framework for residential complexes

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Abstract

Architects must go through a detailed analysis of the environment effects on social, physiological and psychological human aspects to increase human performances. This would be realized through interdisciplinary process between architecture and environmental psychology by understanding the health risks. In other words, these studies lead architects to understand the behavioral, psychological and emotional users' interactions in designing buildings. Moreover, the physical impact of the environment on the health of designing spaces reduce stress at healthcare facilities is clearly visible. Statistical tests confirmed the differences between experts' views of perceived environmental qualities. In addition, it showed a major gap between technology usage and human expectations. Despite, positive distraction is very important too and it was a principal issue in residential complexes' design. Furthermore, based on the principal component analysis (PCA), personal control can decline people' stress through well-equipped and good quality furnishings, enough space to avoid congestion, welcoming entrance of healthcare center, and getting the appropriate natural and artificial light, and positive distraction by existence of green spaces in outdoor spaces, the ability to watch the landscape from the window, and access to Nature and therapeutic gardens in indoor area, more than other variables.

Keywords: Health-Oriented, Design Model, Housing Health, Residential Complex.

1. Introduction:

If design is defined as the art of creating things which should be, instead of those which could only be, then every single design must be sustainable, environmental, green, etc. It also should be proper. But what is a "Proper Design"? Health is one of the factors that defines properness, so important that it might be better to use "Healthy Design" instead of "Proper Design." While a healthy design is always a proper one, the vice versa is not always true [1-3]. As an example, a proper design might only consider the needs of limited people, such as clients, municipals, users, etc., whereas a healthy design tries not to ignore the life and needs of everyone and everything [4, 5]. However, an ideal healthy design may seem difficult to take place in reality, but there are some instances which point out healthy solutions to survive on Earth [7-9]. However, the word "Health" has a clear meaning in English and other languages; it addresses various subjects in different specializations. So, in order to explain what healthy state is, maybe we shall identify the symptoms and the reasons which result in unhealthy states [10].

Although there are several known measurable factors to define health and healthy places, it is necessary to bear in mind that there are also some other factors which could have great effects on each stage of design process, production, usage, and recycling [11]. These other factors differ from place to place, person to person, culture to culture, and time to time; so we are faced with variety of problems and problems of variety. Involved with different challenges, in this chapter, we aim to mention different factors existing in the space between today's unhealthy architecture and the remaining of healthy past architecture of Iran. In describing different factors, the sun has a special importance in our statement while it has very specific role in our culture and past architecture, to the extent that the religion of Mithraism is based on the goddess of the Sun. Besides that, our studio1 particularly focused on the integration of solar and architectural design [12].

2. Sustainable architecture and environmental design

Sustainable architecture and environmental design are the fundamental subjects interpreted in many academic and professional gatherings in the last years [13]. However, we might be far away from accessing the global concepts and expressions; everyone, in accordance with his knowledge, information, and conscience, tries to be effective according to his geographical and cultural coordinates as well as his facilities. Although sometimes the questions and the

architectural solutions are exhibited in the external shell figure, many successful examples were built in which both the problem definition and the design were considered [14]. Due to the fact that it is not so long that just a few inhabitants live in modern sustainable buildings, all aspects of this kind of architecture cannot comprehensively be judged; however, this type of architecture has notable achievements in saving the environmental resources and renewable energies [15]. Nowadays, the world of communication and advanced systems assembles the possibility of ease of interlocution and being updated about global problems. But the distance between underdeveloped countries and modern countries is growing everyday while, in these countries, the people are not aware of magnificent sustainable architectural instances of the modern world, and it is not useful for them if they are [16]. That is because they did not live in them and also copying them did not result in a proper solution for their problems. On the other hand, the global sustainable aims, such as the problem of global warming, are not accessible without paying attention to the effect of each country, so it is strongly probable that the increase in the amount of pollution in these countries is more than the modern world decrease [17]. They also have more population and could be more effective. Looking to architecture as the place of living and to life as the combination of affairs in the environment, we cannot be indifferent to the result of events which occur in this planet, so each of us is somehow associated with it.

3. The Vision and the Solar Architecture

As a skeleton of a creature could inspire the architects and structural engineers to design a structure, the vision of the designer to each fundamental element in architecture has a determinative role to draw and design a building [2]. That is because the life conditions of a building resemble a lot to the life of the residents. Just like the human skin which is vital in adjusting and preserving the ideal state for the body, the role of the façade, as building skin which defines the relation between the interior and the exterior of the building envelope, is crucial [4]. From this point of view, we can analogize the flow of energy and life circulation in a building to the blood flow in a human body. Thus, the function of elements, such as pergolas, porches, semi open spaces, etc., can be compared to human clothes and hats in protecting the skin. Definitely, approaching such a point of view influences our methodology toward a healthy design [5].

It is necessary to observe the differences between the ideology of present generation and our ancestors about subjects like human body and soul, the nature, and the resurrection which is the reason of the contrasts between modern and past medicine, philosophy, and architecture. All the components were thought to be integrated in the past; therefore, Ibn Sina (980–1037 AD) had chosen the title "Healing" for his most significant book in philosophy. Special consideration to the four fundamental elements, based on Greek philosophy, had also impressed Persian philosophers, medicine, and architecture [6]. In addition to the sun which is the representative of fire, the presence of the others – water, air, and earth – is seen in many cases, such as using sluices, air holes, and shelters under the earth to attain more desirable conditions – cellars, reservoirs, ice pits, and etc. But what was the status of these elements to them?

In their insight, a state of being one with nature is an expression of one's vision of self within self. The only way that the expression can serve in its full capacity is when it is reflective: It becomes reflective only when conscious of the divine presence [12]. The reflecting surface now reflects something which is contained, a spirit which is not only one's own. This is the spirit which is universal to all things [13]. By this vision, the methods which are now known as the passive systems had been used in several variations regarding to the climates and environmental specification of each region and formed the rural and urban places. The native architecture and the resulted fabrics in each place are the reflex of its specific features and its potential capacities which are extremely important. In the past architecture of Iran, the people of each district, regardless of being rich or poor, could watch the glamorous scenery of sunrise and sunset every day, stare at the moon every night, and dream in the courtyard beneath the black sky, full of shining stars [14].

Analyzing Iranian architecture in the past, the unwritten principle of respect for the view and scenery of other neighbors is recognized, which is the base of attitude of observing the physical and moral rights of people and the introspective architecture [15]. Unfortunately, the current architecture and urban planning which happen in Iran are absolutely apart from this insight. As soon as the first high-rise apartment is built in one region, it blocks the scenery of all the units in the neighborhood which have spectacular view on it. Obviously, when the second building is constructed, it will also block a part of the previous building view. Gradually, with mass construction of these buildings, almost no view would be left for all [16].

4. Types of dense horizontal houses

There are three different types of horizontal densities [14-17]:

- Linear structure with row house type;
- Surface structure with building type of courtyard house;
- Spatial structure to create overcrowding, which communicates simultaneously with vertical compaction.

But we have to be careful about the exact demarcation and separation of these categories, because there are both row houses and flat buildings with row houses. The form of row houses is complex due to the existence of a street or road. Combining the same species and symmetrical or different row houses causes excessive and, of course, positive reduction of the outer wall surfaces. Hence, the row house type is a narrow and narrow species, to enable the economic use of land (access costs) and economical construction. Sociologically, two elements are always present in row houses [9]:

1. Same: Same in position towards the sun, same perspective and, with the exception of the species at the end, similar neighborhood relations.
2. Visibility: Private and semi-private spaces are often visible, or in other words, parts of the residential unit are located towards the public space, often towards the street.

5. Criteria for assessing horizontal density in housing

5.1. Flexibility and variability

Flexibility in building a backyard or row house means starting with the least change and later expanding, depending on your needs and financial capabilities [2]. The purpose of such schemes is to establish a balanced relationship between the owner's budget and the complete and comprehensive construction plan [3]. Thus, in a building that has maximum development potential, there should be sufficient free and vacant areas for the growing population of residents [5]. "Extension" in height, ie vertical development, is far costlier than horizontal development. Flexibility means adapting a home to the changing needs of its occupants. In general, yard houses and row houses have the same procedure as multi-storey houses, but there are more restrictions on row houses because there are limited levels per floor. The goal here is to develop and neutralize the spaces and then make them usable for various uses or to place the spaces in such a way that they can be easily separated or combined. Designing an

open plan with stairs and toilets and baths as a fixed and permanent element is an action to achieve such a goal [7].

5.2. Communication path

The importance of the communication path in the quality of a building is derived from the pros and cons arguments about the various forms of stairs [9]. Achieving the same criteria for evaluating the quality of the communication route to and from the building does not exist, because these criteria are due to factors such as urban planning (transportation plan, etc.), density, type of housing (central or row yard house), extent The building and many other things depend [11]. Therefore, in one place the unpaved and tree-lined path can define the ideal path, in other places the relaxed residential streets work better. Bridges are also factors that can determine the quality criteria of the communication path. Intermediate passage refers to the space that extends from public to private space [15]. Accordingly, the first communication space or passageway includes the area between the street and the entrance to the house, which may be built with a green space or a yard in front of the house or just by a windbreak. The motivation for such proposals may be very different, so that by removing the front area of the building, it is necessary to place the ground floor on a chair, in order to create this so-called sensory distance to the open space. The quality of the communication path inside the building is often strongly related to factors such as light and landscape design and visibility [17]. The need to create a path inside the apartment can also be done for different reasons. Of course, logical and varied visual relationships are not currently considered standard in Austrian housing. At first, most residents thought it was superfluous to have a logical view of the route and to design interesting and varied lighting, but after a while, they changed their mind and found it very interesting [18].

5.3. The texture of space

Compared to multi-stored buildings, it is possible in row houses and courtyard houses, to construct spaces with different heights and to combine these spaces, or in other words, to combine them [14]. Interference and composition of parts of the building is a kind of approach to horizontal density, because the spaces of each residential unit are located facing or next to other rooms. Of course, this rarely causes mutual disturbances, because today, with the help of technical facilities, sound insulation problems can be solved [19]. But the

psychological effects of this should not be overlooked, because here the issue of owning a home is far less important. In order to achieve a sufficient degree of density, a courtyard house must be built on two floors, at least in some parts. Thus, very large residential units are created that have difficulty overlooking the neighboring courtyard. Lang and Ashworthler designed a central courtyard house, which is located on two different levels. Public space is on the ground floor, but private space is located above the living space of the neighboring house [20]. The staircase connects the two parts, thus providing an interesting example of a central courtyard. The private spaces on the side of the courtyard building are illuminated by a series of skylights under the roof, and in this respect do not pose a problem for the neighbor's privacy. The only view is the inside of your apartment and the yard inside, which is protected from the view of the neighbor [21].

6. Comparison and analysis of design patterns

A closer look at the recent housing patterns that have been introduced and critiqued in the United States in the following years under the theoretical framework of modern urbanism and in the United Kingdom as urban villages or green neighborhoods can be seen. Pedestrian-centric residential complexes are smaller in size than traditional new neighborhoods. The smaller scale makes these sets more adaptable and less intrusive with their surroundings. In addition, the functions and types of integrated construction create more integrity and physical diversity than planned residential complexes. Newer [13] traditional neighborhoods are usually built on a larger scale and are often independent of surrounding towns and complexes. In this case, isolation and lack of connection with the local background are the negative features of these collections. Urban villages establish a better socio-physical relationship with the existing urban structure by being located in the empty tissues of cities or by targeting the renovation of worn-out tissues [14]. The main difference between the smart growth model and other models is the emphasis on the cultural-historical features of the existing textures, the renovation of valuable buildings and the preservation of socio-spatial links of their constituent elements [16].

However, new pedestrian-centric residential complexes and new neighborhoods have much in common in that they seek to design based on small old towns limited by green belts and commercial retail centers, and interconnected neighborhoods centered on schools and other public buildings [19]. The main idea of both models is to create pedestrian-oriented

settlements. Both correct and target the use of the Clarence Perry neighborhood unit model and the proposed ideas of the Raeburn plan [20]. Both models have proposed retail, public transportation, and leisure spaces within walking distance, and have extended the linkage of sidewalks to more than the Raeburn model. In these plans, while giving priority to pedestrian movement, I have avoided the complete separation of cavalry and pedestrian movement, which was one of the negative points of Raeburn's plan. In a general assessment, both schemes are adapted to the "neighborhood unit" model with current conditions [21].

7. Principles and criteria in neighborhood sustainability

7.1. Identity and vitality

Neighborhood readability is one of the criteria for neighborhood identity and sustainability. Neighborhoods and urban spaces can have an understandable structure [22]. For example, getting lost and confused in the city and neighborhoods, especially strangers, is a negative experience [23]. To achieve this, signs can be very important elements in the readability of the neighborhood with the aim of orienting and guiding. These signs can appear in the form of special and unique buildings, special landscapes, street shapes, tall buildings and special physical elements. A good and stable neighborhood is a settlement where the health and well-being of the inhabitants and the survival of living beings are ensured [24]. One of the effective factors in creating vitality in the neighborhood is the existence of suitable public spaces. These spaces with their attractiveness and impact on the human mind can ensure the vitality of the neighborhood [25]. For example, allocating suitable space for pedestrians, doing economic activities, quiet traffic, facilities and suitable grounds for people to shop (not only economically, but also in aspects such as entertainment), recreational spaces such as cinemas and theaters, sports venues, museums, Cultural centers, restaurants and libraries promote the vitality of the neighborhood. Many of the old neighborhoods that had vibrant textures and spaces are the product of a long period that evolved and today are planned to be maintained [26].

7.2. Dynamics and compatibility

Along with the continuity of human life and the vibrancy of nature, urban neighborhoods also go through their historical course in an organic and dynamic way. Neighborhoods are the intersection of interactions and social, economic, physical and environmental factors.

Examples of continuity and the above factors can be seen in the following cases [6]: continuity of life of neighborhood residents from the past to the present, change and continuity in types and patterns of activities, dynamics of neighborhoods relative to the city center, quantity, quality and value of residential buildings and buildings. Non-residential, pattern and life of buildings, pattern of distribution of open spaces, green and road network, various indigenous and non-indigenous building materials, patterns of ownership, equipment and new urban activities in the form of new social and cultural needs, and landscape in terms of nature and neighborhood boundaries [11].

7.3. Access

Moving around the neighborhood can take many forms in the form of its various goals. The main difference between movement and access at the neighborhood scale compared to larger units (such as city, region and country) is its tangible and direct relationship with life and households. Access in the neighborhood is not only for commuting, but you can also expect a space with a variety of functions [27]. Accesses can be a space to enjoy the process of moving. For example, the field is a manifestation of the quality of urbanism and with its shape, scale and quality of its surroundings, it includes concepts of place and sense of space. Such perceptions can be seen in various fields in important cities of the world. These include San Marco Square in Venice, Domo Square in Milan, the Times in New York, Concorde in Paris, Tiananmen in Beijing, Hensley in Prague and the Red Square in Moscow. In this regard, many sidewalks in cities around the world also have different functions related to social interactions, markets and entertainment [28].

8. Conclusions

The house has always been among architectures interest due to the reason that individuals spend their most of their time in it. Among all the issues having been discussed about the house and houses community recently is the issue of the health. Individuals spend more than fifty percent of their daily life in their homes and the studies have shown that Built environments can affect individual's health. The house and the houses communities can affect all aspects of human health such as physical, mental and societal. To consider the importance of this issue is the same as considering the importance of health. The house and houses community should be of the utmost importance as the house is the most essential space for

individuals and all societal levels and all ages use this space and considering these facts is the same as prevention of society from illness and improving society health consciousness.

The objective of this thesis is to design a low height house community (maximum 4 stairs) and the focus of this study is health aspect of the designed house community. The design is aimed for Kashan site with area of 4000 m2 with 200- 300 houses in it and each house being 70-190 m2 in area. In this thesis, first the theories of health issues of the built environments and its experimental studies have been discussed, and then the study deals with identification of low height houses, after that the analysis and allocation of spatial planning is carried out and finally this study carries out the design of the houses communities.

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