Understanding the Pattern Language of Residential Architecture Based on the Theories of "*A Pattern Language*" by Christopher Alexander

Moloud Dashti Naserabadi*[1], Zeynab Yousefizadeh[2]

Abstract:

Pattern language is not a designing method and it has never been claimed that it could be a designing method. Pattern language has always been an attempt to integrate and unify patterns in the designing of a real project. Pattern language will only be useful after the completion of design work for analyses that are done on projects. But in fact, a set of interrelated patterns creates a framework by which it is possible to obtain any kind of design. Architectural plans that are consistent with a framework of Alexander's patterns or foster and develop a framework of Alexander's patterns will be felt more natural than other plans. In terms of objective, the present study is an applied research and it has been conducted by analytical-descriptive approach. In the present study, both quantitative and qualitative research techniques were applied for data collection. Also, data collection has been done by library research. Identification and analysis of vernacular housing, the effect of climate on vernacular architecture and using it in the new architecture are applied to achieve an appropriate model. Since the climate and culture are the most influential factors in the formation of vernacular housing body, so the factors originating from the climate and culture such as the orientation of buildings are identifying elements of vernacular architecture. Using the principles and criteria of these factors in contemporary and regional housing designs gives back the identity to housing architecture.

Keywords: Housing, Pattern language, Residential architecture, Vernacular culture.

---

[1] Corresponding Author, Department of Architecture, Bandar Abbas Branch, Islamic Azad University, Bandar Abbas, Iran.

[2] PhD candidate of Architecture, Bandar Abbas Branch, Islamic Azad University.

Introduction

Our past architecture has an identity because it was tailored to the culture, climate, people and region. Peace and comfort were found in this kind of structure. But today, no trace of this kind of architecture and lines is found in buildings. Today, not only the architecture doesn't reflect local, regional and climate factors, but also it doesn't benefit from the potentials of economic culture. Undoubtedly, this kind of architecture cannot strengthen and enhance local and regional identities and it is moving in the direction of a unipolar world that has only one voice and one culture (Bentley et al., 2003). One of the important parameters of any architecture is the technique or process of building. Each architecture has a method, technique and specific process. It can even be stated explicitly that what constitutes our architecture is related to a difference in construction methods and techniques that create architectural varieties in different parts of the country. While today, with the advancement of technology and the uniformity of details and hard techniques and also the standardization of many equipments, these differences have been disappeared and this fact have made equal the appearance of diverse regions (Ansari, Mahmoudinejad, 2006). Buildings that are currently constructed in the cities of Tabriz, Kerman, Mashhad, Shiraz, Yazd, Bandarabbas and Hamedan are not different from each other while the history of the appearance of buildings, community context and city structures were supposed to represent various cultural traits and native talents of the residents. These features have been disappeared and the context of our towns and villages are not relevant with their history and culture anymore (Minou Iranmanesh, 2013).

Pattern: Literally it means "design and sample or a thing from which an action is done". The parts of the universe are received in the form of pattern. Some of these patterns are fixed and identical, some of them have high discipline and regularity and some others are formed randomly. The ability of the formation of these patterns is particularly important to humans and human actions are formed based on them (Mohajeri, Ghomi, 2008).

Pattern language: It is not an approach or a style of designing. It is a challenge in order to incorporate patterns with each other and implement practical projects. But the most important issue is the relationship between these patterns. In pattern language, the emphasis is on the interaction between people and the environment. Cities and buildings cannot survive for a long time unless the people of the same society build them and share the design language of the building and its construction. This design language has in fact kept alive these people (Alexander, 2002). Alexander provides 253 patterns that can be divided in three main categories: cities, buildings and structures. Each pattern provides a solution for a problem that has been repeated many times in various environments. According to the theory of Alexander,

patterns can respond to the problems of designing but each design can be a solution only once (Alexander, 2002). If we put aside the old patterns in order to innovate in an old discipline, we should take into consideration that a new pattern is better than an old pattern just while it is compatible with most existing patterns. Such a pattern could include a wider context or substitute many old patterns and by this way, it can make the language more coherent. The replacement of these new patterns is a process that aims to strengthen the existing pattern language by modifying and completing it. If these new patterns are properly connected with each other, richer and more stable complex systems will be formed. For example, in the past, city planners and car manufacturers assumed wrongly that the patterns of footpaths and mass transit ways are considered as a threat to automobile transportation network (Rafii Galepardsari, Hassanpour, 2014).

Housing: Literally it means "the place of residence and comfort" (Masaeli, 2012), it is a place in contrast with diverse and noisy spaces. It is a place far from the rush of work where people go after daily works to relax and have a healthy environment.

Residence indicates the establishment of a meaningful link between humans and a given environment. This connection is a result of trying to find identity and the feeling of belonging to a place. Therefore, human is self-conscious when he resides and choose a housing and as a result, he fixes his existence in the world (Mirshahzadeh, Garshasbi, 2014).

Culture: In simple words, culture is what people live with. Culture belongs to people (Edward Taylor, 1832-1917). Culture is defined by a complex set of knowledge, beliefs, arts, laws, ethics, habits and whatever an individual apprehends as a member of the society. Each region of a country could have a different culture from other regions of the country. The architecture cannot be created abstractly and irrelevant to the society. It should inspire from the culture of its context (Mireh, Yari, Garakhlou, 2010).

Purposes of this paper:

1. Providing spatial dimensions and desirable functions of residences based on signs and symptoms of historical-cultural identity.

2. Improving the living standards in contemporary houses in north of Iran

Questions of this paper:

1. How to give direction to signs and symptoms of historical-cultural identity for making of them spatial dimensions and desirable functions?

2. Which solutions can provide residents' sense of belonging to their environment?

Designing theories of Christopher Alexander

In the theories of Christopher Alexander, two main and distinct doctrines can bee seen. His theories were founded firstly based on rationalism of Descartes. Problems were divided into the smallest components and each component was investigated separately and led eventually to a general solution. Later, he took an opposite and different direction. An area where he paid great attention to holistic approach and now, he pays more attention to experimental aspects of design processes. He considers designing patterns as bases for understanding the architectural spaces and future cities for achieving a live quality. In this study, his recent viewpoints of complexity theory are analysed in four stages by studying his intellectual grounds and making clear the content of his designing theories, field of study and experiences. (Alexander, 2008).

Designing patterns can be combined with each other in infinite ways. Each weakness that is seen in a pattern can be hidden in all patterns but it is more likely that this weakness be the result of the misunderstanding of the combination language. Due to a pattern language, Alexander and his followers extracted 253 designing solutions or patterns that arise in architecture. Pattern languages were extended unexpectedly in computer programming and have basic applications. Today, patterns are powerful theoretical frameworks and by using them, complex computer programs can be created (Nasr, 2006).

Today architects are trained for using only a limited vocabulary consisting of simple forms, materials and surfaces. The combinations that they can make by using the vocabulary of this language are even not sufficient for getting closer to the structure of a pattern language. This vocabulary replaces another terminology for pattern language. This terminology is full of words, sentences, paragraphs, chapters and books that express abstractly human and life experiences. Therefore, it can be said that a visual format will cause the destruction of a culture in the same way in which a deadly virus acts. (Salinguerus, 2008).

15 important principles of Christopher Alexander are as following:

1. Various scales

2. Powerful centers

3. Deep link and ambiguity

4. Proper appearance

5. Positive environments

6. Simplicity and serenity

7. Contrast

8. Empty environment

9. Roughness

10. Reflection

11. Local symmetries

12. Repeat

13. Limits

14. Slope

15. Lack of separation

Alexander considers the structure of each pattern as a three-part rule consisting of the relationship between a field, a problem and a solution and notes that the pattern makes a correlation between a determined field, clear and repeated force system in the field and also spatial composition and provides the possibility of release of cognitive-behavioural forces. (Alexander, 2014).

Distinct patterns are gathered in a group to make new patterns with other properties in a higher level. In the hierarchy, patterns in higher levels are dependent to patterns in lower levels.

(Model 1) The patterns of a level are combined with each other to define new patterns in a higher level. (Model 2) two groups of patterns that are farther in terms of scale cannot effectively be linked.

(Model 3) Architectural patterns are associated with social patterns; and by combination, they make a social pattern in a higher level.

Using patterns in designing

Christopher Alexander has defined regular patterns for facilitating the issue of designing based on subsystems. By using these patterns, one can achieve the compatibility between form and context and be sure that the designed form can communicate with humans. A set of interrelated patterns creates a framework through which it is possible to obtain every kind of designing, but these patterns don't determine the designing. Patterns reduce the possibility of forming different designs while they still allow the formation of unlimited designs. In overall, it can be said that limiting the possible ways plays an important role in designing. In this approach, after the removal of some ways, what remains is exactly a set of ways that can communicate with humans.

Architectural designs that are consistent with a framework of Alexander's patterns or in other words, architectural designs that develop and foster a framework of Alexander's patterns will be felt more natural than other designs.

A pattern is a solution that has already been discovered and tested in different circumstances. Time frame of the application of architectural patterns can be a few thousand of years. Usually, no pattern is invented and so the creativity in discovering patterns is focused on the research and scientific observations. Although it may be possible to find new ways for the combination of patterns and sorting them together but this creativity is limited to products that are obtained by using pattern language and not by designing process. (Zoroufchi Bennis, 2010).

Conclusion

Using pattern language in designing helps us to overcome the complexity of things and achieve a desirable form. Pattern languages are disciplined abstracts of human experiences. The validity of patterns is determined through experience and by time. Since pattern languages of a civilization is synonymous with the culture of this civilization, so we can achieve a desirable design in today's houses with Iranian culture by studying traditional Iranian architecture and modelling from it. Obtained statistics indicate that in a region, in addition to considering the climatic characteristics in shaping architectural spaces in connection with the environment and consistent architecture with climate, particular attention must also be paid to micro-climate features of the region. This point is often forgotten and each climate section is evaluated physically by general characteristics. For creating the maximum comfort in connection with Eco architecture, it is better that special features of spatial architecture are considered for each region with micro-climatic characteristics. Therefore, since the interactions of environment and habitat of humans influence other activities of humans and their comfort conditions, so all the items listed should be considered to achieve a superior and sustainable architecture that is commensurate with the climate.

References

Alexander, Christopher (2002). *Architecture and the Secret of Immortality*. Translation: Ghayoumi Bidhendi, Mehrdad, Publications of Shahid Beheshti University of Tehran.

Alexander, Christopher (2008). *Pattern Language: Cities*. Translation: Karbalayi Nouri, Reza. Tehran: Center for the Study and Research of Urbanism and Architecture

Alexander, Christopher (2014). *Standard Patterns in Architecture*. Translation: Heyni, Farshid, 3rd Edition. Tehran: Mehrazan Publishers.

Ansari, Mojtaba & Mahmoudinejad, Hadi (2006). An Inquiry into the Structure of Pattern Language in Urbanism and Traditional Architecture, Housing and Rural Environment.

Bentley, et al. (2003). *Responsive Environments*. Translation: Behzadfar, Mostafa. Tehran: Publications of Iran University of Science and Technology.

Masaeli, Sedigheh (2012). Housing in Khoramshahr From Native Pattern to Design Criteria, *Journal of Fine Arts, Architecture and Urbanism*. No. 45.

Minou, Iranmanesh (2013). Residential Complex Design with the Approach of Pattern Language of Vernacular Architecture of Persian Gulf, The Historic Range of Loft Port.

Mireh, M. Z., Yari, K. & Garakhlou, M. (2010). Analysis of Housing Costs in the Families of the City of Qom, *Science and Research Quarterly of Geographical Society of Iran*. No. 26.

Mirshahzadeh, Shervin & Garshasbi, Samira (2014). *Investigation of Pattern Language of Contemporary Residential Architecture with the Approach of Municipality Criteria*. Azad University of Tabriz.

Mohajeri, Nahid & Ghomi, Shiva (2008). Analytical Approach of Designing Theories of Christopher Alexander. *Journal of City Identity*. 2nd Year, No. 2.

Nasr, Tahere (2006). A Review of the Issue of Identity in Architecture. *Journal of Civil Engineering*. 4th Year, No. 31.

Rafii Galepardsari, Amin & Hassanpour, Forough (2014). *The Impact of Vernacular Architecture in the Formation of Contemporary Residential Architecture*. Islamic Azad University of Tabriz.

Salinguerus, Nicolas (2008). The Structure of Pattern Language, Translation: Zarrinmehr, Saeed. *Quarterly of Architectural Researches*. 4th Volume.

Zoroufchi Bennis, Soghra (2010). *Recovery of Housing Pattern in the Village of Bennis*. Master's Thesis, Art University of Isfahan.