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***Research Article***

# AN INVESTIGATION OF THE ROLE OF NATURE AND GREEN SPACES IN ACHIEVING SUSTAINABLE ARCHITECTURE IN BUILDINGS CASE STUDY: LIBRARY BUILDING))

**Seyedeh Nasibeh Hesami[1] and *Alireza Farsi Mohammadipour[2]**
*[1]Department of Architecture, College of Science and Research, Kurdistan, Islamic Azad University, Sanandaj, Iran*
*[2]Department of Architecture, Faculty of Arts and Architecture, University of Kurdistan, Iran*
**Author for Correspondence*

## ABSTRACT
Nature embodies emotion, passion, joy and beauty; human always tries to be associated with it. In line with the previous researches concerning the impact of nature on improving the educational process and the calming role of it on the body and mind of man, it seems necessary to investigate the quality of interaction with nature in educational settings. Man, architecture and nature influence each other and cannot not be separated from each other; a valuable building is the one that possess all three items. Architecture is a mix of art and science (technology) and creates a favorable environment for human's needs. With an emphasis on the definition and attending the fact that nature is the source of emotion, passion, joy, fragrances, space, and beauty, and with regard to the fact that human is naturally inclined to nature, the man-made structures must always be in harmony and consistent with nature. Since the library is one of the human achievements with the purpose of serving the community and that its existence influences the cultural development and growth. It shall be constructed in accordance with the environment and fascinate any viewer at first sight; in addition to meet users' needs, the library, should be delightful and bring happiness otherwise it would make the users be reluctant to use the library. Library as a learning center attempts to satisfy the personality and cognitive needs of the human to educate them. The satisfaction of these needs can be achieved by connecting with nature. Without a doubt, satisfying these needs is obtained through the connection of architecture with nature and definition of green spaces.

***Keywords:*** *Nature, Green Spaces, Sustainable Architecture, Library*

## INTRODUCTION
With the launch of the world's crisis of energy in the seventies, sustainability emerged and the three dimensions of - social values, environmental resources and designing skills entered the discussions of development. The design and technical knowledge were redefined according to three major themes: energy, environment and ecology; they were evaluated in sustainable development at the scale of the cities and building.

In order to improve the quality of urban life and public participation, the architectural sustainable development must reduce energy consumption and environmental pollution, and also use smaller systems in order to accomplish sustainable development's goals. One of the main goals of sustainable development is to pay attention to the environment, to achieve sustainability and in this regard, special attention should be paid to the use of green spaces in the living environment.

Using green spaces in different parts of the building is an appropriate strategy to achieve sustainability principles. In this kind of architecture, the natural conditions should be protected, adverse impacts on the local ecosystem should be minimized and a good interaction between topography, plants and animals should be established. Human has always been associated with nature and has always been using nature as an important element in plans.

With the manipulation of nature, Man has tried to optimize the nature in a way that it serves his ends. This symbiosis is well seen in human history. In other words, when the man began to use shelter, housing, and

environment, he was aware of the nature and from then on, he has used nature as a fundamental key in the designs and plans (Kiani, 2001; Nasr, 2001). "Returning to the nature and being associated with it, is inevitable" (Khak Zand and Ahmadi, 2007). The symbiosis between man and nature in the Islamic civilization is obvious. Constructions of the Islamic world as well as the other traditional civilizations have been in accordance with nature. For example, the use of wind towers in the central Iranian cities like Yazd, Kashan, and Kerman represent the human's knowledge in exploiting the nature in the Islamic culture.

These constructions being beautiful and efficient, not only are not at odds with the natural environment but also represent a perfect harmony and balance (Nasr, 2001). The importance of this symbiosis is observed in material achievements, and also this connection with the nature, results in the familiarity between man and nature, perpetuates one's relationship with its environment, causes maximum optimal use of natural factors such as energy of lighting, wind and water, and reduces the consumption of energy. But nowadays, one of the problems of contemporary civilization is the ignorance of this architectural dimension.

As a result, it's been tried recently to use architecture in a way that the human landscapes be in line with the nature because experience has proven that this connection influences the formation of personality, the behavior and the functional system of human being.

Addressing sustainable architecture and items involved in the formation of such an approach in the design of architecture, requires a deeper understanding of the goals and sustainable recommendations. On the other hand, environmental, socio-cultural, and economic problems cause us to measure the local architecture and consider the sustainable approach in order to extract the new teachings of architectural design.

The process of globalization in the fields of information technology and communications has led to an increase in the rate of consumption, urbanization and the growing internationalization of capital and commerce around the world, it also has caused the deep culture to mix with new patterns of racial relations and turn into unexpected hybrid cultures.

At the same time, rapid growth of technology incorporates in increasing the environmental problems on a global scale, which may result in ecological disasters such as rapid loss of natural resources and high consumption of energies and increasing amounts of wastes. So it is perceived that artificial construction's environment is a leading cultural branch and the main consumer of energy and resources (Cole *et al.*, 2006).

The quality of the natural environment is not limited to the health and well being of people, it sure meets the emotional and psychological needs, provides underlying developments and progressions, identities formation and extraction of various environmental experiences such as recreation, freshness and vitality, and reconstructs the mind. In contrast, the absence of nature results in negative feelings such as worry, anger, anxiety, helplessness, fear, and pessimism.

Human beings, feel a particular need to be close to nature and to communicate with it in different forms in order to keep their mental health. Revivalist and positive effects of nature on human body and spirit have always influenced researchers and many studies. In this context, the educational spaces as an affective factor in soul and mind of students must bring mental relaxation in relation to the environment in order to improve the educational process.

Nowadays, it's been purposed that the manmade architectural landscapes should be aligned with nature because this alignment is effective in the formation of personality, behavior and human performance system.

***Literature Review***

Recently, different books, articles and guidelines are provided in relation to sustainable architecture, sustainable development and the importance of nature in sustainable buildings. Several researches have been conducted on the influence of nature on education and stabilization of training buildings. In this

study we tried to summarize the implications of their application and indicate their relations with the findings of this study. The following is a summary of a few of researches pointed out.

Mehdi Asghari and Jalal Salek in an article entitled "The relationship of nature in sustainable design of libraries" have noted that the use of natural factors in sustainable design of libraries have been less attended to. In other words, man-made constructions which are in consistent with the climate and the needs of human nature are neglected.

In a way that this ignorance creates a psychologically unsuitable space in the library which doesn't help the users to read effectively. As a result, despite the ancient architecture which regarded simplicity and purity and was in sync and harmony with nature, in the present era, library buildings are not linked to the nature, though a few architecture have used this connection in their designs.

Hossein Momeni Shahraki in the article entitled "the psychological effects of connection with the nature in the study of libraries' spaces " have pointed out that in today's architecture, the use of natural factors in the architecture of the libraries has been less discussed. The man-made construction's compatibility with the climate and the natural needs of human, is not regarded in the design of the libraries, aesthetically and psychologically.

Green library is composed of natural spaces and creates a medium space where social values and a variety of enhanced visual communications are exchanged.

Reza Kiani Zadeh in an article entitled "Strategies for sustainable architecture in the design of libraries" has concluded that, given the complexities of sustainability aspects, needs should be understood in relation to the architecture and therefore the nature and the construction be regarded simultaneously. The compliance of the architectural product with the human is necessary.

The basics of sustainable architecture are defined in relation to the conservation of resources, consistency with human nature and different solutions are provided by strategies and the type of the ultimate products. Libraries offer inspiring and tranquil space that boost the scientific productivity of users. If the principles of sustainable architecture are employed, in addition to reducing pollution and saving resources, a space will be available to human being which is in line with the needs of him.

## MATERIALS AND METHODS

### *Research Methodology*

The study is "cross - sectional". To collect the data we have used scientific bases, including "Science Direct, Pro quest, Wiley, Springer, etc."

### *Sustainability*

*Lexical Meaning of Sustainability*

Sustainable means fixed, preserved, lasting and sustainability means stable, permanent, preserved, remained, steadfast, eternal (Mofidi; Akhtarkavan) and in Dehkhoda dictionary the word sustainability is defined as stability (Dehkhoda, p. 47).

Sustainability is now widely used to describeThe world in which human and natural systems are simultaneously able to survive for a long time in distant future (Bahraini, 2001). Sustainability as a describing participle of development is a situation in which favorability and facilities are not reduced over time, and supports the long-term sustainability (Zahedi and Najafi, 2005) and in the etymological meaning of sustainability and its related words are described below:

Sustain: lengthen or extend in duration or space

Sustainable: Stable, an adjective that describes something that comforts and nurtures and thus leads to the continuity of life and prolong it.

Substance: sustainable process of life (Rezai, 2009) (Azerbaijani and Mofidi, 2003).

*Concepts Sustainability*

From another perspective, it can be said that sustainable development is achieved when the elements of the economy, environment and society interact with each other (Irvani, 2006).

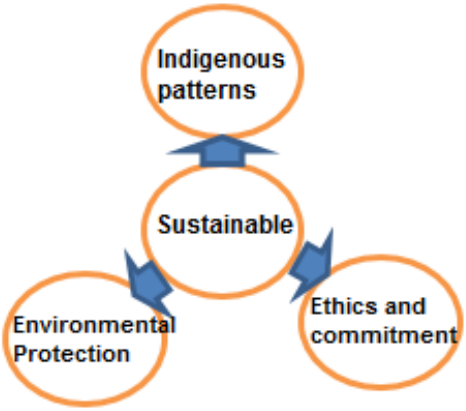


**Figure 1: Diagram of the Constituent Factors in Sustainability**
Source: Momeni Shahraki *et al.*, 2013

Sustainability is the capability to meet the today's spiritual and material requirements with respect to future generations and the preservation and conservation of resources for future generations. These concepts and principles of environmental protection which are in harmony with nature on the one hand, and the local and regional models on the other hand are related to the concepts of ethics and commitment – bearing in mind the approach concerning the lack of resources for future destruction, are three vertices of the triangle called stability (Rezai, 2009).

*Sustainable Architecture*

Sustainable architecture which is a subfield of sustainable development, attempts to provide architectural solutions for creating suitable environmental conditions using climatic design methods and local materials and thus to reduce the negative effects of the environment Architecture (Mehri, 2003). The sustainable architecture is the designing of buildings that impose least damage on the environment in terms of energy and the exploitation of natural resources; a building which has the least incompatibility and inconsistency with the surrounding natural environment or in the wider area and the world (Zandieh and Parvardi Nejad, 2010).

*Preparation of Sustainability*

As mentioned earlier, it is hard to transmit the information and knowledge about new ideas and skills, and many new technologies to other cultures and countries. These issues, even after taking part in a new cultural context, or being partially implemented, were not compliant enough with the new culture and have been replaced or are even ignored. It seems that the key to this problem is the inability of those in charge of the design and promotion of new technologies, expectations and aspirations; those who didn't consider the needs of the local culture. Before claiming that these technologies, as a matter of fact, are applicable and valuable, we must believe that, they are intricately linked to the culture and technologies which are accepted by a group of people, which won't necessarily be accepted by others. The pressure is on issues such as the future, better ways of designing and planning the public domain; thus it would be better to consider the following facts:

Key arguments are the concepts of urban planning, architecture and sustainability which are strongly intertwined.

Ecological and cultural sustainability methods cannot be separated from each other. Guaranteeing environmental responsibility means cultural sensitivity and cultural sustainability, which should include ecological awareness. For cities without a compatible combination, these two items won't be viable (Cole, 2006).

Therefore, the perception of context and local culture is necessary in order to run a successful technology transfer. In order for the new technologies and trainings to be accepted, they must be in line with the expectations and needs of the people and the culture.

The techniques that meet the above specifications could be generally acceptable and provide sustainable architecture. The following criteria can evaluate and comment on the basis of sustainable architecture (Norton, 1999).

The main use of available materials and local transportation

Using the resources that are sufficiently available, to reduce the overall demand in a way that doesn't leads to destruction of the environment.

Independency from equipment that are not simply available

Using the skills that can actually be developed in society

An architecture which is achieved by socio – economic and local context

The one that provides valuable results

The one that responses to effects of local climate

The one that has the flexibility to meet local needs and habits

The one that could be repeated by indigenous people

Many successful examples of sustainable architecture that existed previously were adapted by local efforts and initiatives and sometimes were supported by foreign helps. A long time is needed to conclude what really is sustainable; along time is required to nurture and develop the skills, to prove an idea or to set a sustainable financial system or organization and test it.

*Modifying the Existing Barriers in the Creation of a Sustainable Approach to Architecture*

Equating sustainability with biophysics and neglecting the dependent relationships related to habits, lifestyle and cultural values are not correct. Issues that cause problems in the creation of sustainable architecture are as follows:

1. Policies which are the result of continuous uncriticized growth of sustainable solutions; these policies are subjected to serious problems today.
2. The aesthetic programs that are very subtly understood by the architectural sense, and marginalize sustainable correlations or attend to the form as a statue.
3. This is a false assumption that sustainability can be accomplished through a combination of technologies, which are displayed symbolically. In this case, only the facade of the building is reminiscent of sustainability issues and the collection is still unstable (Willis, 2000). All these issues have made us to believe that sustainable architecture is a technology that can be transferred to any region. There are two problems here:

A. Considering the sustainable architecture as a product

B. Ignoring the fact that any theme and new technology should be matched with the characteristics of the place, in other words lack of attention to local needs and ignoring the influence of nature and the environment in the architecture is incorrect.

1. 1. **Looking at the Nature and Reminiscing its Sanctity**

A work of architecture, from birth, from the moment of the first steps mixes with the ground: receives water from the ground and after the formation of its physical appearance and chemical content, returns everything that had captured before, embraces the breeze and ignores the hurtful winds; it mixes with nature, associates with compliance and productivity of the nature. The establishment of the natural environment, whether because of the compliance and respect, or in relation to the beliefs of ancient culture and history of a land, is formed by elegance and subtlety (Falamaki, 2005). Many buildings are inspired by nature.

The use of natural plants, natural lighting, natural ventilation and thermal properties of the earth and other forces of nature, are all included in this architecture. Also using the natural potentials is evident in the urban design and planning. For the construction, the most effective orientation is to use natural resources and potentials (Pirnia, 2003).

Like any natural being which lives in its own environment and is dependent on it, traditional architecture, is formed in its natural context and is in harmony with it. Its building materials have come from the nature of the environment.

Its design and plan is in such a way that indicates the highest compatibility with the local climate, and imposes the lowest damage to the environment and itself (Tahbaz, 2004). According to Iranian principles, any work which may cause damage to the environment and its components is prohibited. This can be considered as the first step of the sustainability (Vakili *et al.*, 2006).

**Figure 2: The Viewing of Water in the Persian Garden: Refers to Concepts such as Holiness, the Flowing, and Clarity. Management of Water Use in the Garden and Considering the Concept of Content is Evident in the Persian Garden.**

### *2. The Stages of Design and Humanized Design*

Meeting the physical and emotional needs of residents is of special importance in sustainable architecture (Soflaee, 2004). Human design, is the most important principle of sustainable design that attends to the viability of all components of the global environment. This principle is deeply rooted in the need to maintain a chain of ecosystems that sustain life and human survival. In modern societies, more than 70 percent of a person's life is passed in an interior space.

Therefore, the most necessary role of the architecture is to create environments which sustain security, health, physical welfare, mental health and the productivity of its inhabitants.

In the meantime, the operating efficiency of the plan should not be forgotten: Is the efficiency of a product that has a low energy consumption equal to the previous products' efficiency which lacked that feature? (Kim, 1998).

### *3. Man, Nature, Architecture*

Man, nature, and architecture are three important principles for the creation of favorable conditions in terms of psychological, physical comfort as well as sustainable architecture; each of these three items are related with each other mutually. (Relation between man and nature, man and architecture, nature and architecture have a profound impact on each other (Figure 3).

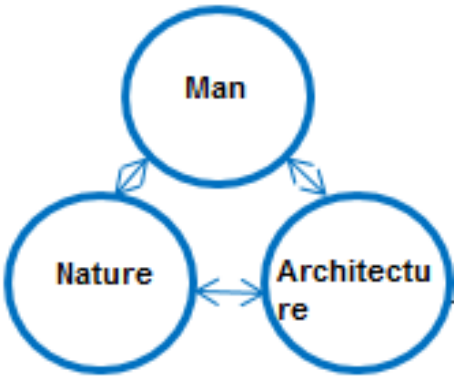


**Figure 3: The Mutual Relationship Between Man and Nature**
Source: Momeni Shahraki *et al.*, 2013

*Relation Between Man and Nature*
The researchers classify the connection with nature two three phase; looking at the natural or the images of nature, involvement in nature and interaction with nature (Akbar *et al.*, 2010). They believe that the exposure to nature, either conscious or unconscious causes some positive responses. Though the basic genetic feeling towards any desire to respond to nature and the natural environment is one of the weaknesses of the human, it needs education, culture and frequent experience of the natural environment (Hinds, 2011). In recent years many studies regarding the impact of the natural environment have indicated that looking at the nature or even looking at pictures and videos of the natural landscapes reduce stress and eye fatigue (Shibata, 2004). Another group of studies have shown that seeing the nature, hearing the sounds of nature and any experience of nature can reduce stress and tension (Kellert, 2005). Relationship with nature creates a sense of calmness and peace of mind for users of the space; the people who enjoy plants in their work environment, are more efficient, more comfortable, healthier and more creative, they are under less stress and pressure than those who do not have such thing in their work space (Smith, 2009). Nature impact on people is different according to the characteristics of the natural environment. Parks, gardens, beaches, rivers and the sea induce a sense of joy, entertainment, comfort, convenience and conversation. A sense of privacy, freedom and vitality is more satisfied in the fore Stand Mountains. Sceneries and environments having water are =important sites for recreation, entertainment, socialization and social activities and watching the built environment with the presence of water, induce more positive impacts than the environment which are just green (Hinds, 2001).
*The Relationship Between Man and Architecture*
Architecture is an art that encircle us; humans are more influenced by the environment rather than influencing it. A person who creates a work of art, is suffering from a shortage of reality. House decorations, painting, etc. are created due to a shortage; the man wants to compensate this shortage. It may be concluded that human is not satisfied and wants to compensate this lack through art (Doctor Shariati's speech about art).

## *4. The Psychological Effects of Nature on Human*

Basically, green space in the city (settlement of behavior), causes more efficiency and brings better quality of life in addition to physical health and mental comfort, (Ebrahim Zadeh and Ebadijocandel, 2008). So, the way of construction and the formation of green spaces can have direct effects on the psyche of visitors; researches show that an important part of healing goals are achieved through viewing the natural landscape and green space (Kaplan, 1999). The important role of green spaces in improving health, particularly mental health of citizens is noted below:

Vandenberg studies indicate that forest trees and park-like landscape reduce stress and anger, cause joy and increase focus (Vandenberg, 2003).
Based on the analysis of Fuji and Nakamur and the presence of hedges is of a profound impact on relaxation and tranquility of human society (Fuji and Nakamurand, 1992).
Effects of watching trees and natural resources reduce stress, bring health, reduce blood pressure, increase the positive effects and reduce the aggressiveness of the results (Hartig, 2003).
Studies of Grahn and Ottosson show that old gardens with a variety of fruit trees and flowers cause people to be more focused (Grahn and Ottosson, 2005).
A study in Sistan showed that the development of urban green spaces by changing the microclimate -with lower temperature and cooling air- raises the comfort level of the citizens (Nakhaei Moghadam *et al.*, 2007).
The meaning of calmness, is to have mental comfort and one of the few places that crate the opportunity to be calm – even for a short period of time- is nature or green space. The reasons for the creation of peace and mental effects are mentioned in the following:
A) The effects of green color of plants: is recommended for the treatment of neurological diseases and psychiatric disorders. This color, in fact, boosts morality, pride, confidence, power and domination on events, so it is effective in the relaxation and refreshment, and it also increases the value of tolerance and patience (green color has a calming effect on human body and mind).
B) Aesthetic effects: watching the lush trees and beautiful, colorful and exquisite flowers, the peace in various species of plants cause human to comfort his thinking; it has been proved that some of the trees with a splash a substance called photonesia induce a state of tranquility and ecstasy in humans. The green space plays a major role in the human nervous balance.
The other effects of green space on human performance are photosynthesis (oxygen and chlorophyll).

## *5. The Benefits of Green Spaces in Buildings*

The use of green spaces and green buildings can cause considerable vegetation that could control the environmental conditions. Green architecture is a new approach to the life of all organisms whose lives have started by nature and depend on it. Preventing the damages to nature, we can achieve an environment that is full of health and safety for the residents. The most important advantages of green spaces in the building are as follows:
Green spaces in the building would beautify the view of the city and the residential surrounding area.
Green spaces in the building would beautify the landscape surrounding the residential units.
Green spaces control the humidity of the environment space and balance the quality of the space
Green spaces control prevents the waste of energy, reduce the effect of UV radiation and temperature changes.

## *6. The Relationship Between Architecture and the Natural Human Needs*

Library as a learning center attempts to satisfy the personality and cognitive needs and help people develop. Therefore, the building of library should be designed in a way that allows the library to achieve this goal. In other words, when the biological needs are considered, the architect should provide a comfortable environment for library users, according to existing climatic conditions and optimum use of natural factors. In the next stage safety hierarchical needs are required. The architecture of the library should secure users against any psychological stresses such as fear, panic, stress and natural disasters such as flood, storm, earthquake and fire because human being hates the factors that jeopardize his identity and security. So the architecture can respond to the needs of the users' security in two ways, one by selecting suitable and safe environment and the other with respect to the strength of the structure. The sense of belonging means the desire for closer communication with other users of the library and taking part in group activities to meet the informational needs. This can be achieved through public identity in architecture i.e. the creation of suitable and friendly environments for more interaction with other users in a way that the users can easily spend a few minutes with other users and establish a friendly relationship. The next step of needs, is the need to be respected (self-esteem, the self-confidence, independence, etc.);

these needs are observed in all users. The library's architecture should be such that the users feel a sense of personality and prestige, thus the identification of identity in architecture satisfies this need. Other needs are self-actualization, the need of knowledge, the need to understand- these needs are in higher positions in the hierarchy of needs. The need for self-actualization is when people are trying to reveal what have in themselves, therefore, it is expected that the space and libraries not only provide pleasure and comfort in person but also should create an ideal place for contemplation and learning through the development of identity in architecture and a better u relaxing atmosphere so that a sense of creativity and innovation is raised during the study, and the inner talents of the users are reached in the library (Schultz and Sydney, 1999).

If the library considers all human needs, it can be expected that the environment has been developed according to the needs of the users. For this purpose, if an architect wants to design a building of library that meets the needs of the user, he must fully recognize the existing climatic conditions and use it in order to meet user' needs.

The relationship between human needs and the way of responding to the needs of architecture are shown in the following. According to what was said before, in order to make architecture of libraries be in harmony with human needs and to satisfy these needs, one requires an understanding of the environmental and climatic conditions.

Thus, according to the environmental conditions, especially on the basis of existing environmental problems, the architects and builders of libraries may create a comfortable and relaxing environment. As the past Iranian architecture has observed this coexistence with nature.

One of the things that architects have given particular attention is to understand the characteristics of the nature. This knowledge has at least two aspects; one of them relate to characteristics such as climate, geographical location like whether and the other aspect relate to the knowledge about materials found in nature and their application to the topographic characteristics.

*1. The Effects of Interaction with Nature in Educational Spaces*

Psycho evolutionary theory and attention restoration theory are two important theory that emphasize on the benefits of using nature. According to Psycho evolutionary theory, natural places are useful in stress reduction and relaxation. In this theory, nature provides a visually favorable physical environment that reduces stress and generates positive emotions and limits thoughts, and raises a general sense of health and wellbeing. This theory focuses on the emotional mechanisms (Matsuoaka, 2010). Thus, the theory indicates the positive effects of nature in reducing stress and increasing mental relaxation in educational environments. In attention restoration theory emphasizes on people's capacity to directly focus. This theory has been studied in educational areas, and focuses on cognitive processes.

*1.1. Impact of nature on research spaces (library)*

As stated above, man, architecture and nature, influence each other and are not separable from each other; a valuable building is the one that possess all three items. Now we attempt to study the impact and importance of nature in the architecture of libraries; libraries are public cultural spaces that have a significant impact on their clients. Although development in any society not only is based on financial or physical resources, but also is based upon human resources. Educational institutions (such as schools) and cultural organizations (library), are responsible for training expert and committed human resources in every society, such institutions in addition to the transfer of knowledge and cultural heritage of mankind, train people and generate knowledge.

The role of climate on human's physical and mental comfort is undeniable. In this regard, the thermal performance of architectural and building elements in moderating the weather conditions is particularly important, as the most important issue for people in any environment, is his comfort. Especially when the human needs to think and focus in that environment. We attempt to describe the role of nature in architecture, libraries, and library construction methods, by answering topographic and climatic conditions and their impact on increasing the number of visitors in terms of aesthetic and psychological features.

## *2. Description of Library*

The work Ketab Khaneh is the persian equivalent of library. It is the combination of two words of Arabic and Persian books( Ketab) + Home (Khaneh), Ketab is an Arabic word meaning written or writing something, Khaneh roots from "Khan" in the sense of space, place. Greeks called it Bibliotheca and Romans called it Libri which was derived from the term Liber meaning book. In medieval English it was called Librairie and in Old French it was Librarie. The term changed and turned into library. In most European and Latin languages it is called Bibliothek and Biblioteca Bibliootheque. In ancient Persia, the term "Dezhnebesht 'or castle of Books was used to convey the meaning of library. In the area of Islamic and Arabic culture, words such as the House of Wisdom (Beit al Hakmeh, Dar al Hakmeh), 'House of Science (Dar al Elm), treasury warrant (Khazanatol Hekam), books' tank (Makhzan al Kotob) were refered to the concept of library, among which Dar-al-kotob and Maktabeh are now commonly used (Asghari, 2014).

### *6.1 Conditions of a Favorable Library for Individuals*

The desire to establish close social relationships with other users of the library and participate in group activities to meet the intellectual and informational needs are achieved through public identity in architecture. The creation of suitable and friendly environment for users to establish more interaction in such a way that the users can easily spend a few minutes with other users in the libraries and establish a friendly relationship.

The next step of needs, is the need to be respected (self-esteem, the self-confidence, independence, etc.); these needs are observed in all users. The library's architecture should be such that the users feel a sense of personality and prestige, thus the identification of identity in architecture satisfies this need. Other needs are self-actualization, the need of knowledge, the need to understand- these needs are in higher positions in the hierarchy of needs. The need for self-actualization is when people are trying to reveal what have in themselves, therefore, it is expected that the space and libraries not only provide pleasure and comfort in person but also should create an ideal place for contemplation and learning through the development of identity in architecture and a better u relaxing atmosphere so that a sense of creativity and innovation is raised during the study, and the inner talents of the users are reached in the library (Schultz and Sydney, 1999).

If the library considers all human needs, it can be expected that the environment has been developed according to the needs of the users. For this purpose, if an architect wants to design a building of library that meets the needs of the user, he must fully recognize the existing climatic conditions and use it in order to meet user' needs.

### *6.2 The Necessity of Sustainable Design in Libraries*

Libraries, either within the city or within the scientific research centers, include a huge range of books and magazines; they aim at transferring the knowledge to users. The quality of that transition is in light of the circumstances that space provides. Libraries' space provides the conditions of learning through study and focus; greater efficiency has a direct relationship with the appropriate space.

Providing comfort as an ultimate Architectural goal must be preserved in libraries and space impresses the users. Thus, in designing libraries, creation of a quiet, inspiring and lively environment is important because it brings physical and mental health. Like other buildings of the city, sustainable design of libraries creates an efficient atmosphere similar to natural resources whose productivity is a top priority. But what separates the libraries from other buildings, is the users. People with different level of knowledge and interests from different social groups attend and spend time in the libraries; so the architecture of the building influences almost every one.

Therefore, any person without the knowledge of architecture can become a representative of the principles and methods of coexistence with the natural environment and represent them to other people, just by being in the space and being influenced by simple solutions. The inspiring spirit of space causes more creativity and efficiency with respect to the status of library in society; it has a major impact on research progress and achievements (Kayani Zadeh, 2011).

### *6.3 Importance of Nature in Architecture of Libraries*

Architectural is a mix of art and science (technology) in order to create a favorable environment for human needs (Hellman, 2002). With an emphasis on the definition and attending the fact that nature is the source of emotion, passion, joy, fragrances, space, and beauty, and with regard to the fact that human is naturally inclined to nature, the man-made structures must always be in harmony and consistent with nature. Since the library is one of the human achievements with the purpose of serving the community and that its existence influences the cultural development and growth. It shall be made in accordance with the environment and fascinate any viewer at first sight; in addition to meet users' needs, the library, should be delightful and bring happiness otherwise it would make the users to be reluctant to use the libraries. Thus, when the architecture of the library is based on the principles of logic and in line with the natural demands of human and harmonized with nature, it will induce relaxation for users and also a beautiful environment will be provided to users; resulting in saving costs by natural factors (wind energy, water, and sun).

### *1.1. The Benefits of the Connection of Nature with Architecture of Libraries*

The benefits of nature utilizing architecture is investigated from the two aspects, one from the sect of aesthetic and psychological effect on users and the other from the financial achievements and cost saving aspects. From the aesthetic and psychological aspect, the use of natural materials and the use of green spaces is important for creating communication between the interior and exterior spaces of the library which shape social relations, learning, motivation, and creativity for the users and ultimately bring happiness and satisfaction of the users. The use of green spaces and natural landscapes in front of the library's space stimulates visual sense of beauty and pleasure, silence, serenity, shadow, light and proper ventilation is provided for users and also keep the noise from the library's building. As experiences has proved the brighter the space is, more pleasant the environment is. The best source of lighting in interior spaces of library, is the use of natural light, as opposed to artificial lights (contrast) which cause eye fatigue. Therefore, the use of natural indirect light and in libraries -as centers for preserving valuable books and documents- not only prevent serious damage to the manuscripts and other documents, but also it creates an environment with pleasant light and heat. All these factors have a positive effect on the psyche of the user and encourage him to use the library environment more. Other studies show that the use of free natural energy like light, wind, etc. induce comfort, peace and joy with the lowest costs. The use of wind energy in traditional architecture is a good example of the use of the same free energy in architecture which is not only beautiful but also has an effective role in clarifying the internal space ventilation and cooling the buildings and water storages. In other words, the ancient architecture never uses the large glass windows which cause heat and noise and therefore is never forced to use external energy to cool the building which result in added noise (Ghobadian and Bita). Therefore, adaptation to climatic conditions is the best way to reduce the costs of building and deal with adverse atmospheric factors.

In other words, the areas where the buildings have been built according to the principles of ecological design, the need for mechanical heating and cooling systems is minimized. Instead of using heating and cooling systems, the architecture had provided comfort and a considerable saving without any noise and the need for other devices (Kayani Zadeh, 2011).

## *Conclusion*

Given the complexities of sustainability aspects, needs should be understood in relation to the architecture and therefore the nature. The compliance of the architectural product with human is necessary. Principles of sustainable architecture are defined in relation to the conservation of resources, consistency with human and nature. Also on the basis of strategies and according to the type of product, different solutions are offered. Every public building, because different users and their destinations requires a unique approach in the design. Every public building, because of its different users and destinations, requires a unique approach in the design. Hence achieving sustainable solutions for the design, construction and operation requires a different process.

The revivalist identity of the nature, its symbolic and important place in the culture and mentality of Iranians and the definition of libraries as a cultural, social and educational space, are important factors affecting the sustainable architecture of libraries.

Libraries offer inspiring and peaceful spaces with scientific efficiency and if they use the principles of sustainable architecture, they can reducing pollution and consumption of resources, and provide an appropriate place for human which serves him.

Lack of flexibility of modern twentieth century buildings over the environment and their pure reliance on the use of renewable energies to provide heating and cooling, threatens the life cycle of the planet and its ecosystem. This change of attitude towards human activities and developments are stressed by the planners and policy-makers of international organizations in order to control and compensate for losses incurred in all areas. So the issue of sustainable architecture in sustainable development and solidarity of system's components is of utmost importance.

In this sense, the library, as one of the most distinctive and significant spaces of society, especially in modern architecture, is a symbol of sustainable architecture and attention.

Studies show that in today's architecture, library is less paid attention to and the use of natural elements in the architecture is neglected. In other words, man-made constructions' consistency with the climatic conditions and the inherent needs of human is not regarded well psychologically and aesthetically to be effective in the development of reading. As a result, despite the simplicity and purity of ancient architecture, the buildings were in perfect harmony with nature, the present library buildings are not connected with nature.

Regarding such a strategy the Green library provides the following advantages:

Ecological relationship between buildings and the environment and the flexibility of the building, as a microclimate, to temperature fluctuations, changes in moisture and oxygen would create a favorable condition.

Natural spaces: green library creates an interface space where social values and views are exchanged and visual communications are increased. Iran is also considering the use of modern patterns and local public buildings, and tends to use green spaces in recent years. However, no Regulation is introduced for it. It is therefore important that more researches be conducted in this regard to improve the quality of architecture in keeping with the nature and reducing energy consumption and its capabilities in building a sustainable architecture.

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