

## Checking the Effect of Green Architecture Elements in Educational Buildings Form

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**Abstract:** Architecture design is an easy and convenient job. The structure of space apparently is simple and in fact is so complicated and deep. Changes in architecture history shows changes in culture, thoughts and human acting with the environment. The past valuable works in Iran's architecture possess qualities and stable values which come from deep and wide thoughts and world view of its builders. Complication and multidimensional being of the educational matter and building educational centers which have the space and skeletal dimensions, visual and cognitive qualities, aesthetics dimensions, environmental and regional aspects technology matters and other things; needs to the experts cooperation in a linked and connected system. The purpose of this project is to reach the ways to the green architecture which had been forgotten now a days and the society involved in unpleasant issues. In recent years, many statements and study in principles of sustainable architecture field or green architecture wrote by different researchers from all around the world. In this research, we tried to proceed to the green architecture indexes in educational spaces with checking the library resources, studys, precises and also the harvest fields after the introduction of green architecture history and the applications in Iran.

**Key words:** Green architecture, sustainable architecture, educational buildings, applications, Iran

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### INTRODUCTION

To create a green building, before anything it needs a creator just like anything else. It means that creating a green building will help the individual health of the person who lives there and support him and also causes pleasure and efficiency for them. This subject needs a careful application of certified strategies in architecture such as: using the stable nature and efficient material resource with depending on the sun for heat usage and electricity force and daily lightning and also reusing the wastes and etc. A delicate union and integration creates these strategies. However, it should be considered that transforming the human culture requires a basis and basic changes in the structure of human soul and habitude. We need to discover the unification and concatenate and dependence to each other with a much larger thing than our own. The natural world is a spiritual territory which will overcome to everything. Person at first then the society. This is Bo Lozoff's opinion. He believes that we should make both groups to be agreed with life facts in the world. They believe in the west that the benefit in the environmental design and its designing will progress and succeed when its design group consists of only a group of designers. It is the first company which has done this job. This company consists of architectures, builders and

engineers and finally some of the designers must be responsible in all the projects in this company. This company use cooperation system during its designs. It means that all the members are free to advice but final decision will make by the designers. This is a powerful method in constructions. Designers agree with buildings because of their favor. In another interesting work in this company, they invited from clear-sighted for implementation all results. The important sides which defined different from conventional designs is (Ilaheh, 2010).

The design should almost response to 40% of the needs.it shouldn't response to only 25% of the needs. The design trend is a turbulent and rough. Therefore it require a long time. The design needs to the thoughts of honest groups and experiments. Creating a building needs unification and unity. This unification and unity will lead to changes in human nature. They often say that the green building is a building that has a few negative effects on the environment. The purpose of creating green buildings according to above is improving the weather and preventing from negative effect of construction on environment (Anonymous, 2010).

Saving energy and application of stable energies have no part in the building culture of the country at the moment. Besides that, there are huge numbers in the

house construction of private sector especially rich houses for gingerbread and lack of originality instead of urgent costs. The motivation for these costs is in gingerbread and showing off and finally success in trade especially in make sold. Unfortunately, this matter became a fashion in society which is so alarming. But the solution: discovery the new aesthetic methods for the revolution of the public mind and replacing the life methods based on saving and respecting to the environment instead of degenerate methods. This requires the architects try to conduct public tastes to useful and generator sides instead of following the common tastes. Architects can make people believe that the regional and environmental designs aren't less beautiful than common moldings. We can make the society to have lots of environmental and economic values by architecture such as harmless, calm and etc. the energies that can be named beautiful instead of anything by architects and artists and this is what the future needs. Let's discover the hidden beauties in pure and life-giving energies.

## **MATERIALS AND METHODS**

**Explaining the matter:** Educational spaces have a key role in social and cultural structure of the society. In the educational system, educational manners and contents and also educational spaces from another side are two important factor in children and teenager's training and growing. Fast growing of the population, immigration and transposition in country makes the cities larger and some changes in the structure of settlement residents in residential neighborhood, population density which lead to house issue and also some other problems such as provision of civic services, transportation system, installation system and educational spaces. Private ownership of lands and lack of land and places for creating new schools and improving them faces city area with lack of spaces. Besides all above with considering to the sustainable development of cities in order to create sustainable spaces, educational services must be done by correct locating to make city context. We can introduce an educational space as disciplined organize and with ideal quality which have features and bases coinciding with that complex with settlement and proper adjacency.

**The green architecture history in Iran:** First period from This period was coinciding with the late modernism. Since, this period, modernist had a historical tendency. Within rare works of Nader Ardalan and Kamran Dibakeh who tried to make Iran's architecture alive, this trend went on in Iran. Mirmiran's works also wasn't effect less from daily current in this period. His works show influencing

from past traditional architecture. The impression that his urbanism works got from past cities can be named by its neighborhood of past or creating knots in ways. In this period, Mirmiran was in charge in architecture workstation in Zob Ahan Company and designed several new cities such as "poolad shahr", "Zirab" and "zarand no".

In this city designs, the only inspiration resource for Mirmiran wasn't our own country architecture but also it follows the world architecture too. The inspiration that Mirmiran had from mushe safdi's work in poolad shahr school designs shows this fact and he designs them as same shape developing boxes.

From the single buildings in this era, we can name "pabdana tea house". The single building which designed in a garden. In this researcher we can see post modernism tendency in the arches of poolad shahr schools. Surly the whole work was a mixture of modern and postmodern. The designed house is fully relaxant especially with blue balanced lines which used in design.

**Second period from 57-67:** In this period, Mirmiran's works coinciding with Islamic revolution in Iran which one of its accomplishment was traditional historical attitude, nativist and emphasis on Islamic values and also coinciding with the high level of postmodernist in the west which also emphasis on tradition.

The most important works which Mirmiran has done in this period was Isfahan comprehensive plan, Isfahan city area plan and also housing development center and urbanization in Isfahan. In this period, Mirmiran introduced the concept of city area for the first time in the country and mentioned the urgent of care to city area of the country as specific, distinct and separate religion arena in city management and planning. Success in this design turns to an efficient tool in conduction and expansion process in city region and cause this design passaged for cities with more than a million populations. In the expansion center we can also observe tendency to the past in Mirmiran's work.

## **RESULTS AND DISCUSSION**

**Checking the root of words correlate with sustain in oxford dictionary:** Sustain Support, keeping alive, continuous.

**Sustainable:** Sustainability as an adjective describes something that causes peace, nourishing and life support therefore, it makes life longer and continuous. In Dehkhoda dictionary sustain means stable, solid, firm strong established, confirm, immortal and continual. It also means resistance and persistence in general meaning sustainability means the ability of a society, ecosystem or a current system to function in an unlimited future without

getting weak in the consequence of shortage in the sources that the system rely on or handling more task that it can take (Ghazizadi, 1994).

Green or sustainable architecture is a back bone and provides health for the residences that live in that environment and causes their satisfaction, to reach this goal we need to use new energies in Architecture. Using the nature and relying on the solar system for heating, cooling, electricity and reusing the waste and structural unifying, will form these strategies. We must find ourselves again by joining and relying on each other with something far wider than us because the universe has mystic territory that excellence towards everything (Ali, 2010).

#### **Principles of green architecture:**

- First principle: energy protection
- Second principle: facing with climate
- Third principle: decrease in usage of new energies
- Fourth principle: users respect
- Fifth principle: site respect
- Sixth principle: holism

**Energy protection principle:** Designing and building of every building should be in a way that minimizes the need for fossil fuels. Necessity of this principle in the past ages is inevitable with no doubt regarding to constructions. And maybe the reason of this principle negligence in the contemporary is the variety of materials and new technologies.

This time shift in the users need changes using different materials or different material combinations. Biologic complex theory states that a shelter that keeps people safe from heat and the cold, this and some other mutual reasons are why people use to build their buildings next to each other. Buildings ( in interaction of local climate) that built to decrease the fossil energy usage comparing to the normal structures are individual and solo experiences, therefore they are imperfect efforts to create green architecture. Lots of this experiences are the result of solo work and effort and therefore they won't count as an stable principle of designing and building todays constructions.

**Facing with climate principle:** The building's design should be somehow that they be able to use the local climate and energy sources. Building shape and its conferment and managing the internal spaces could improve the inner peace of the building. Meanwhile by using the correct Insulation we can decrease the fossil fuel input of the building. These two mentioned process obviously will have lots of overlap and common points with each other. Wood use to be the main source of

energy before spreading the comprehensive use of the fossil energy and nowadays it still supplies approximately 15% of our energy need. When the wood sources became rare and low it was natural for the people to use the sun heat in order to reduce the wood consumption. Greece cities like Prine changed their location to avoid flood and made an east-west rectangular network on the city streets, this structures changed the buildings orientation to the south witch had a better chance of using the sun energy. Romans followed the greek solar designing principle, however they used transparent windows (which was AC first century invention) in order to increase the heat. With the increase of wood deficiency it became more common for rich folks to build their house toward the sun and also building public bathroom with this system. Culture of building designing according to climate won't be limited to heating rules but also in lots of climates architect had to design a cool surrounding in order to make a more comfortable atmosphere in the building. In the current age the common solution is using a ventilation system which is an insufficient and against climate, meanwhile it consumes lots of energy and will be wrong using it even when we have enough and cheap energy cause it generates pollution (Lab *et al.*, 2013).

**Decrease in usage of new energies principle:** Every building should be designed to minimize the consumption of the new energies and at the end of their sufficient lifetime remain as a source for other constructions. Although, the purpose of this principle like the other principles is to make new buildings but we should remember that lots of natural sources of the world are currently in artificial environment and restoration and improvement of the current buildings situation to reduce the biological-environmental effects has the same value as making new structures. We should pay attention that there aren't enough sources to create artificial environment so we can use some new ones to rebuild the old buildings. In this way we can use recycled materials or recycled spaces, building recycling and its materials are part of architecture history. In 1077 and 1115 Santa Albas monastery reconstructed by using the bricks of a romans broken mansion near them. Wood framework used in the medieval where pieces of wood joined together and coded in the carpenter workshop and then taken apart for transportation to the buildings. By using this method they could transport a part of the building to another place; even nowadays they transport does coded parts. Sometimes the whole building used to transport in order to make a new one. For example while building the Victoria and Albert museum in London, they didn't need the former building in the other site and in 1865 they offered to assign this metal building to the North, South and East local officials in order to build a new museum. West

officials accepted the offer and the building were done in 1872 in its new location and now it's a museum for children. Usually reaching to the new sources minimizes and new methods will shape that helps us to use buildings with special purpose to build some other buildings with another goal, although, some necessary changes could change the shape of the whole building. It's a disaster for some who care about building protection and permanent keeping and it makes the mind wonder that building should be still and without change cause once it had some value or in order to keep the efficiency and sufficiency we should make changes? A green process might only judge by the current sources. If the required sources for changing a building are less than the ones for destroying and reconstruction, the changes will be more likely to do. Also, this won't be disrespectful to the historical constructions. Plus these constructions might have other values that need to be paid attention to. These problems in changing the buildings in order to adjust to. New needs specially enhancing the building function and performance might lead to the change in the outward view of the buildings will appear with more paradox. Change in some old building to make new functions can bring some problems and costs. Although, recycling big buildings together and in a big city can be a bigger benefit than its problems and costs. Buildings reconstruction can save the sources in small and big cities and prevent the society form getting crashed (Lab *et al.*, 2013).

**Users respect principle:** Green architecture respects the all people using the building. It seems that this principle has very weak connections to the pollution from climate change and destroying ozone layer. However, the green process of architecture witch includes the respects for all the common sources of a building will contain humans too. All of the buildings had been made by humans in some this fact will be respected but in some others they try to deny the human role in the building process. Some robots in Japan has the human role of building a construction but function for a robot in a project is too repeat a special duty. But in a different scale an architect can rely on its skills on doing some other irrelevant activities. More respect for human needs and work force can be experienced in two separate directions. It's necessary for a professional builder to pay attention to materials safety, wealth and process of shaping the building as much as its importance to the workers or the building future users is important for the whole human beings. The architects slowly became aware of the poisonous structural sites and recently they banned using dangerous materials and insulator materials contain CFC in buildings.

Another form of human association witch needs more attention is sharing and positive interference of the users in the process of designing and building if they ignore using it, a useful source has become wasted. Lots of buildings benefit from this energy and the consequences are some of the big pleasing buildings (Farshad, 2014).

**Site respect principle:** Australian architect express this odd sentence: "Every building should touch the ground gently and mild". This sentence contains a property of the relation between site and the building witch is necessary for the green process and of course has some wider qualities. A building that consumes energy toothily will generate pollution and will be strange to its own consumers and users and. Therefore, it will never touch the ground mildly. A more correct digest form this sentence is that we can't take out a building from a site and then try to resuscitate the past site situation. This kind of relation is visible in the residence of Bedouin Arabs; their comfort and lightness in touch of the ground wasn't only because of their transporting houses but also in using materials and the things that they carry with themselves. The black tents of Bedouin Arabs were made of wool of their goats, sheep and camels. When they set these tents on the ground by providing an efficient cross section aerodynamically, it could prevent from tearing it down with strong winds. Tents stood strongly by holding them with ropes and didn't use much wood in the structure cause wood is a rare source in the desert. Although in urban society's people leave their native living to settle down but we still need temporary structures for conventions and cultural purposes. These structures usually have the shape of the Bedouin tent. The design made by Dutch architects in 86 festival in Sonsbirds in order to protect the fragile statues on the outside of the building and plus they designed the tent in a way to be silent. This constructions use 4 types of materials: precast concrete for foundation, transparent windows for the walls, steel ceiling for truss and connections and resin silicon to connect the glass parts together. Glass fins were attached to the glass walls to add more rigidity to the wall and providing a place for connecting the light metal truss containing the glass ceiling. The building bottom were normal and in order to prevent getting muddy they covered it with wood, this way the ground site will be the same after the festival. This structure can be used in every other festivals and shows or its components can be used in different places (Lab *et al.*, 2013).

**Holism principle:** All of the green principles need to take part in a general trend to create an artificial environment. It's not an easy task to find a building witch maintain all of the green principles because green architecture hasn't

been known completely yet. A green architecture is more than just a building and it should contain a stable form of an urban environment. City is something more than just a set of buildings in fact it contains systems which interact with one another (systems for living and entertainment) that with their special forms have their own framework. With a closer look to these systems we can trace the outlook of the future cities.

**Indexes of designing an educational environment:** As it's mentioned below, the purpose of architecture is to shape the living location of humans. In other words, it's a plate for the food; plate is the building and the food is human life, by putting one of these two (shape and life) ahead of another one or incorrect knowledge of these two may lead to unsuccessful architecture. People don't feel comfort, alive, stable and peaceful with unpleasant architecture (Aimnaz, 2008). Standards and principles of the green educational spaces:

- Functional: it means libraries look good, have enough space and be stable
- Flexibility: flexibility in spaces, consuming something could be changed easily
- Accessibility: social places that encourage people to think without depending or easy consumptions
- Variable: libraries with different researching and learning places, for different medias
- Effective: spaces should be organized in order to improve the relation between services and users
- Enlightening: an inspirational environment with great quality to encourage people to learn and educate
- Being environmental proper: having proper environmental conditions for the users
- Safety: for users, equipment's, data and building
- Efficiency: economically in area, workers and current costs
- Being proper for IT: with creating flexible spaces for users and workers
- Attractiveness: illustrating the place in a way that captures the visitors and the mother institution (university) minds

## CONCLUSION

Educational spaces should be responsive for needs in according to the educational changes in pattern. With progress in technology and skills, teacher and kid demands change every day. Therefore, educational places should provide this flexibility and be a stable response throughout the time. The demand for flexibility in educational places can be divided into functional, social, psychological economical groups. Therefore demand for accommodation to psychological and social problems makes educational places needier for flexibility. An

educational flexibility pattern which is education trend and form of the educational place, describes a live place and a trend which make the place.

In designing a flexible pattern there some important factors that we should pay attention to: multifunctional view of a space, incorporation and separation and spreading possibilities. Surveying a flexible pattern has different dimensions, in Kaleen scale, in combination with other factors and functions and marking a better view of the city in which strength the feeling of attachment, self-confidence, honor of the student. In the middle scale in organizing the parts, floor number, connection types of educational places should be in a way that answers the new teaching, technology progress in the past few years. In small scale, accuracy regarding to choosing shape and form of educational parts, furniture and their details that create positive perception according to its usage throughout the time (Mehdi and Niloofar, 2012).

Architecture of educational places is one of the most complex and difficult, professional branches in designing. Skeletal identity of a good educational place effects from the place flexibility, technical-engineering legitimate, climate situations and geographic locations. The scale of building is to use the best from the minimum space that its design affects the place in a transformative way. Using good quality materials with high flexibility is very efficient in flexibility of the educational spaces.

## REFERENCES

- Ainaz, L.A., 2008. The effect of environmental factors on learning and behavior in educational environments in city. *Urban Manage. Q.*, 27: 17-31.
- Ali, K., 2010. Creativity in the Process of Architectural Design. Mehr-e-Imam Publisher, Tabriz, Iran.
- Anonymous, 2010. Criteria for designing educational buildings (Architectural planning for primary and secondary schools). Management and Programming Organization, Iran.
- Elaheh, R., 2010. Sustainable architecture in the design of educational spaces. *J. Edu.*, 1: 10-11.
- Farshad, S., 2014. Green Building Design Principles. WPBeginner Publisher, Iran.
- Ghazizade, B., 1994. Principles and Criteria for Designing Educational Spaces. Organization for Development Renovation and Equipping Schools, Tehran, Iran.
- Lab, Watson, Kent and Donald, 2013. Climate Design Theoretical and Applied Principles of Energy use in the Building (Translated by Mohammad Faiz Mahdavi and Vahid Ghobadian). University of Tehran Press, Tehran, Iran.
- Mehdi, M.M. and N. Niloofar, 2012. Flexible Learning Spaces. University of Tehran, Tehran, Iran.