



Requirements of Designing a Kindergarten based on Green Architecture

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Abstract: *Kindergartens are a suitable environment for children's collective activities and provide a setting for children's social development. Therefore, designing kindergartens is an effective factor influencing development and growth of children. Built based on sustainable and green architecture, green building offers a model of living together along with the optimal use of natural resources and environmental protection. This study aims to investigate the requirements and parameters involved in the design of Kindergartens based on green architecture. This research has been conducted based on library research method. Also, a case where the principles of green Kindergartens have been respected was found and evaluated. The results of the research present a framework for sustainability and environmental protection in the design of kindergarten that can provide an environment for developing children's creativity and promoting their mental health.*

Keywords: *Sustainable Development, Sustainable Architecture, Green Architecture, Green Building, Kindergarten*

INTRODUCTION

The early years of life of everyone are considered as the most important opportunity for learning and values and attitudes are basically taught in this period. These basic values are considered as a solution and guide which can help people in case of facing with challenges. For that reason, proper learning and education during the childhood help people to have a better performance with regard to decision making in all stages of life. On the other hand, innovation and creativity, which are fundamental abilities of all children, begin to develop during the childhood (Piaget, 2004). Childhood is a period in which every child is greatly affected from the surroundings and the sense of curiosity naturally develops.

Since children spend a great deal of time in Kindergarten, it plays an essential role in education of children. Furthermore, kindergartens serve as the most primary educational and social environments in which children live which adds to its importance. Both education and educational environments leave the greatest impact on developing the mentality of society; therefore, the need to create spaces suitable enough for the activity of children is of great importance. It is important that children's mental, emotional, social and physical wellbeing are developed in a suitable space which can be achieved through proper designing details with respect to children's behavior patterns (Lotfatta, 2010).

Sustainable architecture is an effort to develop an environmentally-friendly environment and pursues to optimize the environmental impacts on children’s health, and this cannot be achieved if the design of kindergartens is overlooked (Roy Madhumita, 2008). Given that the personality of children differs in different ages and because there are many principles available to design a kindergarten, it is very crucial to provide a framework to utilize the principles of sustainable architecture when designing a kindergarten. This paper aims to investigate, identify and evaluate the factors affecting the design of green buildings, as well as principles and criteria for designing the green kindergartens. The results show that using sustainable and green architecture can provide a suitable basis for institutionalizing the goals of sustainable development in children as a future generation.

(Figure 1) shows the key items, parameters and effective solutions for green building design based on the conducted studies.

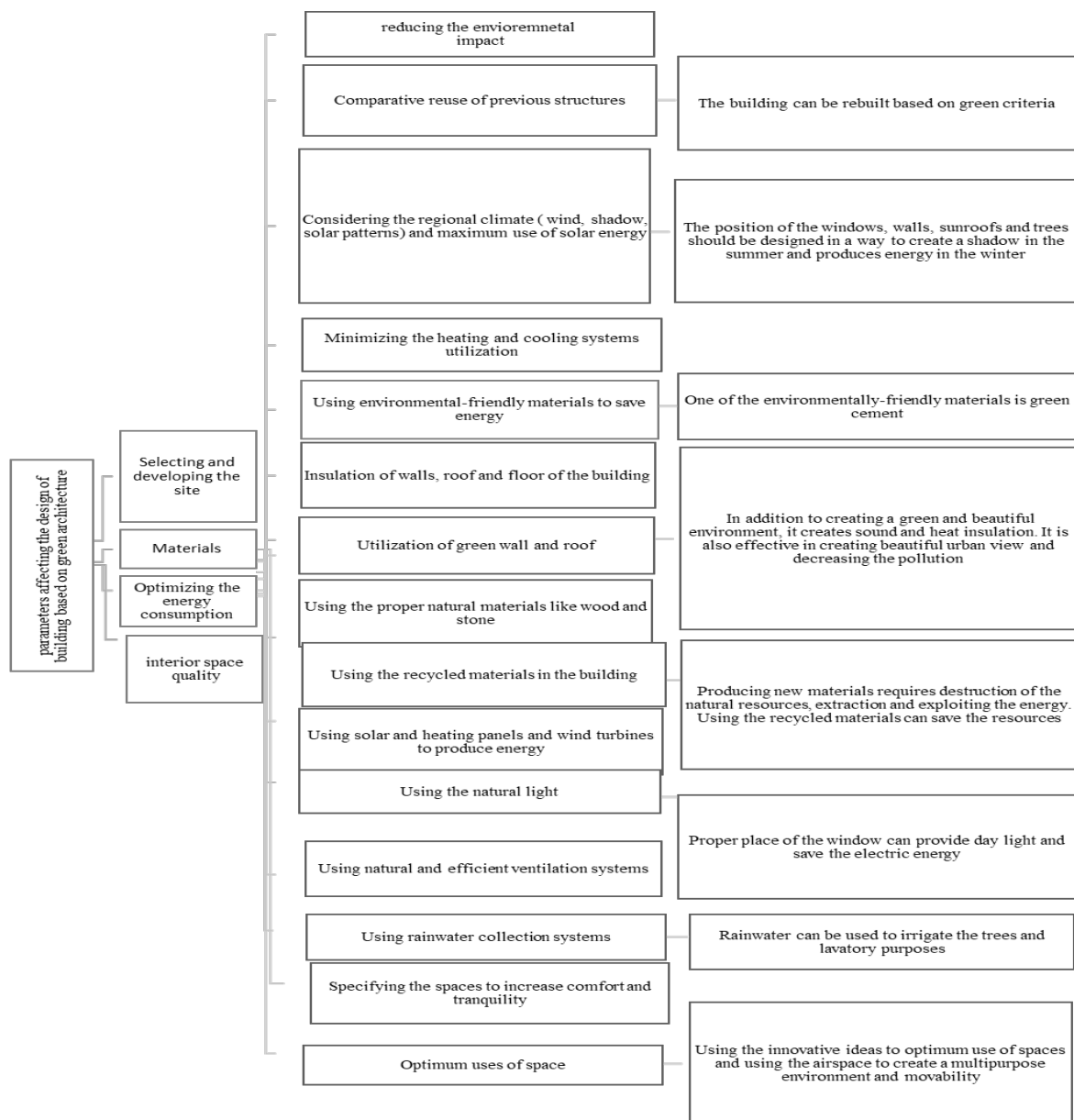


Figure 1: The parameters and solutions affecting the design of building in green structures

Designing the kindergarten

Childhood is a part of every one's life and although, it is a short period, due to the effectiveness and developing the individual's personality, it is of paramount importance. Children constitute the most sensitive and affected age range of the community members. And in the most important and sensitive years of their life, i.e. since the characteristic, mental, physical and social development bases are formed to the time they enter into the city, they demand social living experience in their own scale which requires the provision of children-friendly and intimate space (Nagasawa, 2010).

Studies show that the modern society has endowed the child with ability to be aware of almost everything very fast. Thus, knowing about their personality and solving their mental problems enable us to have successful grown up people for the future. Playing is provides a sense of passion and excitement in children and suitable games can help them to develop and promote their intelligence and memory, as well as their skills.

Psychologists consider children's personality different at any age, but they have commonalities in the social setting. Considering the common social characteristics of children, one can refer to playing with the peers, being active and energetic and having the ability to recognize the spaces. Being in collective environments such as kindergartens, plays an important role in the development of children by improving the child's conscious, reasoning and developing the observational skills (Paulus, 2000).

When designing a Kindergarten, designers are looking for a quiet environment away from the commotion of the world of adults, and try to create a world with beautiful colors and full of happiness in which the children are able to find a chance to express their new ideas and improve their talents. There are also opportunities for exploration, testing and playing for children by taking into account the safety principles (Hart, 1995). The design of a Kindergarten aims to be a place where children can use their creativity. A suitable environment like this encourages exploration behaviors in young children and increases the thinking ability, particularly their ability to solve the problem, as well as their creativity.

The proposed principles for designing a green Kindergarten

Architecture for children has particular features which should be considered in child-friendly environment designing. It is necessary to provide a framework to design children environments by taking into account the large population of children and the shortcomings and deficiencies children may encounter with in the environments purposefully designed for them. Reviewing the related literature in this paper, the methodological principles of designing kindergartens concerning the principles of green architecture has been presented. These principles are developed based on several foundations that combine the principles of designing kindergartens and green buildings as presented in Table 1 below.

Table 1: The proposed principles for designing green kindergarten

Rank	Principle	Descriptions
1	Safety	One-story kindergarten building is one of the best ways to consider the safety measures for children.
2	Appropriate road access	Roads are designed with the zero possible risk for children.
3	Creating new and innovative forms	Creating new forms in the whole building or in some parts of the building like windows and doors can make the building more attractive.
4	Observing the scale	As the users are children, scales should be taken into account
5	Optimum use of energy	Optimum use of energy by taking advantage of sunlight, wind direction, proper establishment of the building and other climate requirements

		and consideration.
6	Natural light	Natural light produces energy savings. Also, natural light can have amazing beneficial effects on children.
7	Creating open spaces and playgrounds	Creating open spaces and yards are essential issues to improve children's activity.
8	Designing natural spaces	The green space brings joy and happiness to children.
9	Creating spatial diversity	Spatial diversity creates efficient various spaces accustomed with the needs of children.
10	Proper frontage design	Proper frontage design can be attractive and captures children's attention.
11	Access to malleable materials	The accessibility to natural materials like sand, mud, soil can help children to develop their fantasies.
12	Selecting the proper materials	Use of environmentally-friendly materials and use of non-toxic natural materials such as stone and wood.

Case Study Review

- **Domestic case study: The institute for children and adolescents artistic development**

The construction of this large cultural institute, which is considered to be the largest cultural and artistic complex designed particularly for the children and adolescents in Iran, was finished in 1993. This institute is of the most important complexes frequently used to hold festivals, exhibitions and national and international conferences in the field of culture, literature and art of children and adolescents, as well as other fields in (Figure 2).

The complex consists of various spaces and workshops designed particularly for children and adolescents and the spaces are suitable enough for all types of cultural and artistic activities such as various educational workshops, spaces such as the children's market, children's galleries and museum, to name a few. Some exhibition and conference halls with total area of 7000 meter, two amphitheatres, conference halls, restaurants, etc., are among the exhibition, and conference venues of this center in (Figure 3).



Figure 2: The institute for children and adolescents artistic development



Figure 3: The institute for children and adolescents artistic development

A. Advantages

- 1) Being located in an appropriate sight considering the neighborhood (tennis court of the park, chess federation, Hijab sports complex and Laleh Park).
- 2) Being located in an appropriate sight considering urban accessibility

B. Disadvantages

- 1) The lack of the proper design considering children's morale
- 2) The majority of the designed spaces is allocated to administrative activities. This restricts the freedom of activity of children in the whole building.
- 3) Long and poor lightning corridors can be terrifying for children.
- 4) Most of the events arranged to be hold in this complex are official ones and percent of children participation is low.
- 5) The users have no direct access to the Laleh Park which is opposite to the designed objectives of the complex.
- 6) The users have no access to the roof and solar clock which is opposite to the designed objectives of the complex.
- 7) The free spaces of this center are restricted and children cannot use them.
- 8) Compared to the goals of center, the library space is too small.
- 9) The restaurant of the center is closed and inactive.
- 10) The building is designed with poor visibility features and people can rarely see the building. So, a few people know about this center and its activities.

• **A foreign case study: Auroville Kindergarten**

The Kindergarten is for 60-65 children of 3-7 years of age belonging to different nationalities. It is located in south India with residents from about 30 countries of the world in (Figure 4).

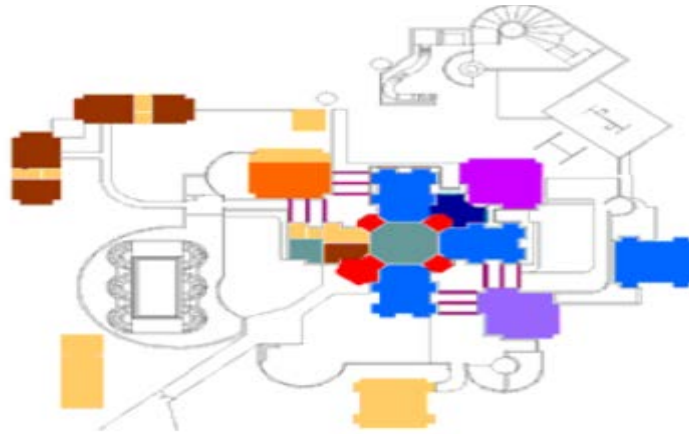


Figure 4: The architectural plan of the Auroville Kindergarten

Suggestions of some architects

Bill Anis Verrous: This small and enjoyable kindergarten is designed for 70 students. Local materials and techniques are used in this kindergarten to create a suitable and adaptable environment. There is not no teacher-student hierarchy. Each class is privately linked to the green outer space and allows the students to attend outdoor activities. This is an unusual and friendly atmosphere for a variety of activities.

Redovek Almada: The architecture design of this kindergarten is harmonized with the warm climate of this region. Accordingly, the design of the kindergarten complex is the reinterpretation of the local materials and techniques which are used to develop open spaces and pleasant atmosphere so that children are able to enjoy the studying freely.

Bail Di Jong: "What can I say? Is it possible for my child to attend this kindergarten and enjoys the facilities?" There is a simple but delicate design between the interior and exterior spaces in this complex. This place is real representation of the spirit and principle of education that is creating the motivation and encouragement to study in (Figure 5).





Figure 5: Auroville Kindergarten

Examining the samples and using their architectural design

The following table represents the samples of the collected subjects that have some characteristics in common with the design project. The positive and negative aspects of the samples have been

considered and content of the design project has been developed. It has been tried to create a comprehensive and practical project in the final analysis.

Projects		The composition			Content
Image	Project's Name	Configuration	Positive points	Negative points	
	Institute for the Artistic Creation of Children and Adolescents	Cube configuration and entrance page	1- Located in an appropriate neighborhoods. 2- located in a place where offers unprecedented urban accessibility	1- There is no direct access to the Laleh park which is opposite to the designed objectives of the complex. 2- Long and not well-lighted corridors have created a terrifying space.	Promoting the sense of invitation of the building is the main subject of the architect.
	Aurovolle Kindergarten	Covered with glass	Architecture design of this kindergarten is harmonized with the warm climate of this region.	-	Transparency of the building represents the transparency of interior and exterior spaces interconnection

Conclusion

Sustainable and green architecture is not only observes and meets the general principles of design to provide users with comfort and tranquility, it also intends to protect the environment and optimize energy consumption. The buildings designed based on this philosophy, which are referred to as green structures, are established according to the concepts of sustainable development. Resource conservation, increased comfort and productivity and reducing long-term operational costs are among the outstanding achievements of the green architecture. Kindergartens are the first educational centers that each human being can be associated with and is a potential place to use and enjoy the green and sustainable architecture to provide a suitable basis for institutionalizing the goals of sustainable development in children. The design of sustainable and green kindergartens can potentially provide a suitable place for future generations to grow and develop. It also familiarizes the children with a sustainable lifestyle.

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