



Designing for Children

- With focus on 'Play + Learn'

Communing with Nature: Integrating Biophilic Design in Interior Environments of Play Schools

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Abstract: Children are born to learn through play, and are inclined to be inquisitive about things around them. Learning through play allows children to become more creative, in tune with their environment and makes them lifelong learners. This paper examines how Biophilic design can be applied in children's play schools and creates connections between children and Nature and enhance the built environments that are inhabited by children. The study tries to find out ways and means to create interactions with nature i.e. the concept of Biophilia that would positively impact children's play and learning experiences.

For the purpose of study the authors have focused towards the age group of 2 - 6 years. The authors have conducted case studies of Play schools, interviews of parents, children and teachers. Access to all that Nature has to offer can raise the natural curiosity of children and simultaneously allay their fear of nature, and the Biophobia of things natural that city-dwelling children are increasingly showing.

Key words: Biophilic Design, Children, Learn, Nature, Play

1. Introduction

"Every child should have mud pies, grasshoppers, water bugs, tadpoles, frogs, mud turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb. Brooks to wade, water lilies, woodchucks, bats, bees, butterflies, various animals to pet, hay fields, pine-cones, rocks to roll, sand, snakes, huckleberries and hornets; and any child who has been deprived of these has been deprived of the best part of...education" -Luther Burbank (2000, p,91)

Children are born to learn through play and are inclined to be inquisitive about things around them. Learning through play allows children to become more creative, in tune with their environment and makes them lifelong learners. Play is an essential part of a child's

development. Through creative activities, imaginative play and simple games, children develop cognitive and social skills, while growing in confidence as they make sense of the world around them. One form of play for young children is playing in and with nature.

In large cities like Delhi, millions of inhabitants live in concrete jungles, far removed from nature. There are parks and gardens that are available to some of the residents, but on the whole, natural cover has been destroyed to make way for the buildings necessary for a city to function. A majority of existing play-schools/day-cares are located in densely populated urban areas and very few of them have adequate green spaces.

The lack of open green spaces in play-schools of cities has a negative impact on the ways children can play, and this can negatively affect the development of personal bonds with nature. According to Louv (2008), Nature Deficit disorder is the human cost of being alienated from Nature, and includes attention disorders, learning difficulties and increasing rates of physical illnesses and mental health issues.

Parents today are more and more hesitant to let their children spend time with Nature, due to safety issues like increasing crimes and traffic conditions, and are reluctant to send children out alone, unsupervised or unchaperoned. Also, with both parents working these days, and nuclear families becoming the norm there are very few families that have grandparents living with them. Hence, such families have to resort to send their children to daycares.

Bringing Nature in kindergartens, and creating opportunities to engage with nature may perhaps be the last opportunity for mankind to "... reconnect children with the natural world and create a future generation that values and preserves nature (Herrington & Studtmann 1998).

Natural environments can be a place where children can play and learn and this can be achieved by taking children out into nature (which is already done through excursions, zoo trips, picnics) but another way is to bring Nature to children's learning and play spaces/schools by using Biophilia and its characteristics in the built form and the interior environments of such spaces. This paper explores how Biophilic design can be applied in the interior environments of children's play schools and create connections between children and Nature.

2. Methodology

The paper examines how nature plays an important role in developing young minds. For the purpose of study the authors have focused on children of age group of 2 - 6 years.

The first step was literature review to understand the concepts and ideas of Play, Learning and Biophilia and also the importance of nature in Play and Learn. To further understand the application of nature inside a playschool, two live case studies were conducted in Delhi along with a few online (International) case studies of playschools that follow the concept of learning while playing in nature. To start with, the authors studied the concept of Forest Kindergarten that first originated in Denmark in 1950s.

The following schools were studied as case studies:

- The Learning Tree, New Delhi India
- Mirambika School, New Delhi India
- Fuji Kindergarten , Tachikawa , Japan
- Hakusui Nursery School, Japan

Apart from case studies, interviews and surveys were also conducted with Parents, Teachers of the two schools in Delhi. The Authors also studied the elements of Biophilia and ways to incorporate these in Interiors of Playschools where there is no or very less connect with outdoors.

3. Literature Review

3.1 What is Play?

The United Nations High Commission for Human Rights has recognized Play as a right of every child, and considers it vital for optimal child development.

According to a dictionary definition, Play is ‘engaging in enjoyable and recreational activity, especially for young children’. Most people associate the word ‘play’ with children, and play is seen as informal and non-serious activities that keep the children engaged and entertained. However, several studies have shown that during early childhood, Play is a very important activity for a child, and is an integral component of the learning experience for the very young (Almon, 2003).

3.2 Importance of Play in Early Childhood

“A child who is not being stimulated, by being played with, and who has few opportunities to explore his or her surroundings, may fail to link up fully those

neural connections and pathways which will be needed for later learning” (Sutton-Smith 1997).

Early play experiences set the stage for all subsequent social and emotional development of children. Children can learn to make sense of, and explore the world around them, and learn also to master social behaviors and competencies (Bruner 1972, Pellegrini 2007)

Play takes the form of work for young children. The concept of play is actually the basis for personality building in early childhood, as children learn various skills that are essential for all round development, and most of these come in handy in life as grown-ups. These skills include:

- Problem solving
- Development of Fine and Gross Motor skills
- Self-discovery, gaining independence and positive self-esteem
- Learning to play with others and develop a spirit of collaboration.
- Creative thinking and imagination
- Learning to compromise, share and resolve conflicts

3.3 Definition of Learning

Learning is defined as gaining or understanding of a skill by study, instruction, or experience. It is an important process and part of human behavior and all learning involves activities that may be either physical or mental.

During early childhood, distinguishing between Play and Learn is difficult as they cannot be separated. Playing leads to learning and the play activities provide opportunities to children to develop awareness of the social and cultural norms and the environment around them (Crain and William, 2001).

3.4 Why nature is important for children?

“Come forth in the light of things. Let nature be your teacher” William Wordsworth

Playing in Nature-based settings can give first-hand experiences of Nature to children.

Nature provides a perfect classroom setting because it can offer children the opportunities for cognitive, social and physical development in healthy ways (Kahn, 2002)

According to Kellert (2005) young children are continually seeking to give names and categories to things that they see around them, and their fascination for birds, trees, animals etc. is seen universally. Children have an inherently curious nature and want to know everything about everything.

3.5 What is Biophilia ?

“Biophilic design is the deliberate attempt to translate an understanding of the inherent human affinity to affiliate with natural systems and processes—known as Biophilia—into the design of the built environment.” (Kellert, S., Wilson 1993)

Biophilic design incorporates natural materials, natural light, vegetation, nature views, natural landscapes and other experiences of the natural world into the modern built environment, with an aim to create healthier and more efficient spaces for humans.

Biophobia is defined as an aversion to nature and can range from discomfort in natural places to contempt and dislike for whatever that is not man-made. Biophobia also manifests itself in looking at nature as a disposable resource, something that does not have value or importance.

To allow children to develop inclination towards Biophilia, they must be provided opportunities and settings to learn about Nature so that they can form bonds with the natural world in their early years. This is important as the children can then grow up with respect and love for Nature, and feel the need to preserve and nurture it.

4. Case Studies of Play schools; Interviews of Parents and Teachers:

4.1 The Learning Tree, New Delhi, India (since 1995):

Design Philosophy: Fostering an environment that respects and promotes creativity

Started by three sisters (Deepak Chopra, Tara Chopra and Kiran Chopra) and situated in in the Lutyens’ zone of New Delhi, this school aims to foster an environment that respects and promotes creativity. The children are exposed to the wonders of nature and its seasonal cycles. Every class opens out to a garden which has fruit trees and plenty of plants, and there are no walls or doors in them, the spaces covered with eco-friendly bamboo roofs. There are rabbits, hamsters and birds too. Catering to age groups 2 to 5 years, children learn by seeing and playing with Nature through activities like:

Germination of plants; watering of plants; feeding the animals. There is a sandpit, muddy puddles to jump in and the children enjoy the rains by getting wet during the monsoons.



Figure.1 Sand pit and swings in the garden



Figure.2 Large trees and bushes in the playschool, door less classrooms opening in the garden

4.2 Mirambika Playschool, New Delhi, India (Built in 1981):

Characterized by the concept of “Openness” which includes self-directed learning, encouraging exploration, sensitivity, the school campus has lot of green spaces, swings and

slides, a Neem grove - these spaces becomes setting for learning activities. Designed by architect Sanjay Prakash, Mirambika is an attempt to foster an environment that can keep the interests of all the children alive and gives them a certain degree of freedom. The spaces were designed to be organic, amorphous, and such that the boundary between inside space and outside space would vanish; the building has large glass windows that create an impression of unobstructed space and at the same time give the building the benefit of natural light and breeze.

Note: The building discussed here is the old building of Mirambika. The school functioned from this old building from 1981 till 2014. For the purpose of this paper the parents of students who studied in the old building were interviewed.

Response from parents and teachers of both schools: Integrating nature in school has helped in the development of children. Unlike other mainstream and conventional schools, these two schools do not have closed classrooms; children are free to move inside outside as per their wish; No books, the children learn in and with nature; children are more explorative and adventurous; are thinkers; calm and grounded; close to nature and empathetic. The schools focus on inner growth and development of children.



Figure.3 Mirambika - Delhi; Slide for Children to Play, Open layout of classrooms opening in the common area (Prakash, S).



Figure.4 Animals and Birds inside the school building, children and teachers playing with the inhabitants of nature (Mirambika)



Figure.5 Young Children playing together in muddy puddles, exploring nature, bathing together (Mirambika)



Figure.6 Lush green campus with trees, animals and birds, Open classrooms, Children learning adventure and empathy (Prakash, S)

4.3 Fuji Kindergarten, Tokyo Japan (Built in 2007):

Located in the Tachikawa suburb of Tokyo, this Montessori system based kindergarten can accommodate 600 children of ages 2-6 years. With no physical boundaries in the classroom, the kindergarten has been designed as a continuous space. The project won the Moriama RAIC International prize in 2017, recognized for being a work of architecture that is “Transformative within its societal context”

In keeping with the essential philosophy of the architect, there is no play equipment as such, and the entire school serves as a giant playground. Children can move freely around the school, run, fall down and pick themselves up, get wet and in short, do all the messy things that all children love to do, without being censured. The free plan design encourages independence and collaboration, without any need for the children to sit still at one place. The building is wrapped around a central open playground and there are three trees that pierce through the structure that the children can climb. The building does not have any full height partitions that divide classrooms and the resultant spaces allow connection between the outside and insides.



Figure . 7 Fuji Kindergarten , roof that act a play and activity area for children (Kida, K. 2017)



Figure. 8 Fuji Kindergarten Building design with open spaces and greenery inside allowing Children to play and explore nature (Kida, K. 2017)

4.4 Hokusui Nursery School, Chiba, Japan (built 2015)

Design Philosophy: “a nursery school is a large house.”

Surrounded by mountains and forest, the school building is designed on a gentle slope to resemble a large set of stairs. Using large sliding windows, the sloping roof draws in the breeze to create ventilation, and the interior columns emulate trees in a forest. Children are free to run around, within and on top of the roof,

The space within is unenclosed, without any internal walls or divisions. Children of different ages mingle with each other. According to the architect, Kentaro Yamazaki, their goal was to design a space that was fun for children and blended into the surrounding nature, to foster interaction.



Figure. 8 Kids playing in Muddy puddle and roof of the school (Kurozumi, N. 2015)



Figure. 9 Connection with outdoors (Kurozumi, N. 2015)

5. Analysis

As seen in the discussions and case studies, contact with Nature is stimulating and beneficial for us although urban populations spend a major chunk of their days in controlled environments and indoor spaces. We do not get enough time to be outdoors in Nature. Therefore, simulating Nature in our built spaces can be done by integrating Biophilic design in a space both inside and outside. Since most cities are densely populated, with not enough open spaces except for a few parks and green areas, the next step would be the use of Biophilia in interior design and styling inside the buildings. Biophilia can be integrated in Interiors by creating three different types of experiences for the users:

1) **Direct experience of Nature:** This is achieved by providing direct contact with elements of nature in the built environment using Natural Lighting, Ventilation,

capitalizing on prevalent breezes, plants, animals, water, natural landscapes and their inherent constituents etc.

2) **Indirect experience of nature:** This is done through contact with nature in the form of images and references that have allusions to the elements of nature. This can include artwork, photographs, using natural materials in furnishings and surface claddings.

Patterns and motifs inspired by Nature are also used for this purpose.

3) **Experience of space and place:** This can be done by including forms and shapes that occur in Nature and using references that can be traced back to Natural environment, in the form of meandering pathways, streams and rivers, play of light and shadow to mimic the same in a forest or a wooded area, elements of surprise and breakout spaces that might evoke a sense of refuge/personal zone or communal spaces.

Attributes of Biophilia that can be used in interiors for Playschools / Kindergartens

Light: Natural lighting is a good way to create Biophilic environments. Best used in atriums, open courtyards, this can also be used in the form of artificial lighting in spaces that lack natural lighting. Lighting schemes can also mimic changing patterns of daylight and sunset etc.

Architecture/Structure: Providing large windows can give unrestricted views of the outside and form a connection between the interior and the exterior. If there is a scope for creating punctures in the roofs, then an open space can work wonders.

Garden/Indoor garden/Terrace / Roof Garden: in the form of actual garden, indoor plants, vertical gardens on the façade as well as indoors, terrace garden. This can also include herb gardens, potted herbs etc. Green Walls, Living Walls, Moss Art and Living canvas are some other ways to bring Nature inside.

Air: Using the prevalent breezes or winds for cross-ventilation.

Water: Presence of water in the form of actual waterbodies if possible, indoor water features, table top fountains, aquariums can be used

Plants: Potted plants, terrariums, hanging baskets, living walls can be used in interior spaces

Animals: Harmless, non-ferocious animals can be used in the form of pets, like rabbits, cats, dogs, guinea pigs, parrots and other birds

Natural landscapes and ecosystems in the form of Imagery: Scenery /wallpaper/wall murals/photographs etc. that show natural scenes and landscapes.

Colours of nature: Using colours seen in nature within the interiors. These could be a part of surfaces, textiles, lighting schemes or furniture

Materiality of Nature: Using natural materials for surfaces, structure, furniture and ornamentation can bring Nature closer for the users of the interior spaces. Playing with natural textures can create a tactile and haptic quality within the space

Shapes and Forms derived from Nature: Using Biomorphic forms and shapes in the actual structure, interiors as well as furniture can evoke the idea of Nature. Bio-mimicry can be another way to achieve this. Columns and vertical elements can be treated as tree trunks, and horizontals could be seen as branches.

Patterns and motifs from Nature: Taking a leaf literally out of Nature's book, patterns seen in nature can be employed in interiors in the form of surface treatments, furniture shapes and forms, decoratives, lighting (beehive, fish scales, flowers, leaf veination etc.)

Pathways, Meanders, Mazes: These can mimic paths seen in nature. Flows of rivers and streams can also be emulated. Creating mazes and labyrinths can evoke imagery and experience of a dense forest.

Light and Shadow play: Using diffused and direct light, filtered light, light pools, etc. interesting interiors can be created.

Prospects, Vistas, Refuge: Creating nooks and crannies to allow for some alone-time for kids and also providing communal spaces where everyone comes together; these can emulate places of refuge and gathering. Using illusions and false perspective to create interest can be a representation of vistas and prospects

Transitional spaces: Corridors and other circulation spaces can be so designed to give a feel of bridges or crossings (mountain passes)

Play areas: Creating sandpits, grassy lawn/turf in flooring, space for small mudrooms/muddy puddles where children can make a mess

Activities: Plant germination, growing herbs, Farm-to-table concept, feeding and playing with pets, growing basic food (if space is available).

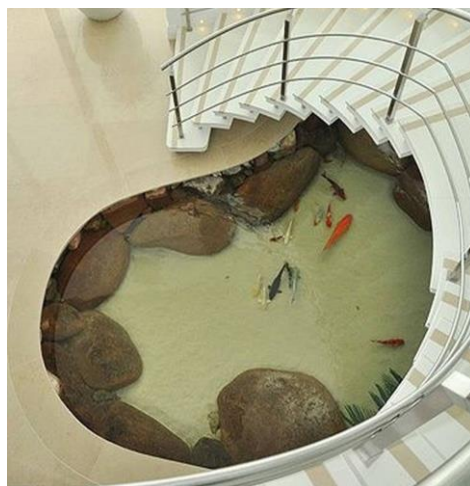


Figure. 10 Fish Pond



Figure. 11 Punctured Ceiling



Figure. 12 Little Planet



Figure.13 Bamboo tunnels



Figure. 14 Tree Stump as Furniture

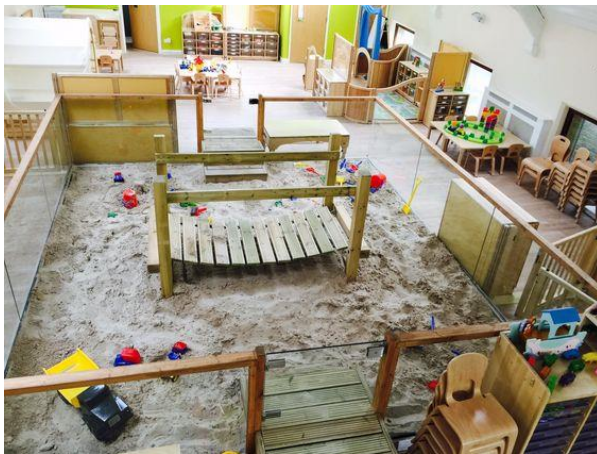


Figure.15 Sand Pit and Bridge



Figure. 16 Rocks inside the play school



Figure.17 Organic Forms



Figure. 18 Punctured Ceiling



Figure.19 Green Wall



Figure. 20 Playing with water



Figure.15 Large windows allowing sunlight to enter

6. Conclusions

Since the children of today shall become the custodians of the future, inculcating value and respect for the environment in the children's minds can ensure that they are well equipped to deal with environmental issues as grown-ups.

“There's no way that we can help children to learn to love and preserve this planet if we don't give them direct experiences with the miracles and blessings of nature.” Anita Olds

The aim of creating playschool and kindergarten should be “immersing children in nature”.

Van den Born et al (2001) mention that exposing children to direct experiences of natural environments are important for shaping future attitudes towards Nature. Nature helps children to develop sense of freedom, collaboration and risk taking ability. It also helps to develop empathy in the mind of the child, a quality that is very important in today's fractious world. This inclusion of Nature can only be done with the help of ideas of Biophilia in design. As discussed above, the lack of such exposure to the Natural world leads to wrong perceptions in the minds of children about natural phenomenon and activities

The idea of introducing nature inside schools/play schools through Biophilia is still not a permanent solution of integrating nature or bringing children closer to nature. The real integration will happen if at the planning stage of a town/city, the architects and town-

planners sit together and plan/carve out spaces for kindergartens and playschool within nature or as part of city farms, wherein Nature comes along naturally not intentionally.

If kids are not able to go out and explore the world as they did in the past generations, then we have the responsibility to provide them in school gardens/ that's where they figure out how the world works. Danks,S (2013).

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