Joyful Foundations

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JOYFUL FOUNDATIONS

Thesis Report

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Abstract

The word school originates from the Greek work skhole meaning “leisure space”, but today the word stands in stark disparity from leisure. The thesis “joyful foundations” is an exploration of the connections between play and learning. The research examines how the architectonics of educational facilities serve as catalysts for nurturing cognitive, physical, emotional, and social growth in young learners. Despite advancements in educational theories towards child-centric models, yet there exists a notable disparity between pedagogical ideals and architectural implementations within school environments in the context of Pakistan. Drawing insights from seminal works by educational theorists such as Jean Piaget and Vygotsky, this research explores the pivotal role of play in facilitating meaningful learning experiences and documenting child development. By reimagining schools not merely as physical structures but as dynamic environments tailored to children's needs, the study advocates for the seamless integration of play and learning within architectural design principles and emphasizes in generating playful environment.

The investigation critically evaluates the prevalent dichotomy between child-oriented and adult-oriented spaces, particularly evident in schools across Islamabad. It highlights the imperative for architectural interventions that transcend functional objectives to embrace the ethos of child-centeredness, thereby fostering environments conducive to exploration, creativity, and self-discovery.

Through an exploration-based methodology, this study endeavours to reimagine school typologies as active caretakers in child development. Leveraging the theoretical frameworks of affordance and the aesthetics of joy, the proposed architectural paradigm seeks to enhance the intrinsic play value of educational structures. By reshaping the physical and psychological dynamics of school spaces, the envisioned prototypes are conceptually drawn from the old practices of “galli ka khail” to serve as exemplars of holistic development, where architecture becomes the third teacher in a child's developmental journey.

Ultimately, this thesis advocates for a paradigm shift in architectural discourse with the context of Pakistan—one that places children at the forefront of design considerations and empowers educational spaces to emerge as transformative agents in shaping the future generations.

Keywords: Learn through play, Cognitive development, Aesthetics of joy, Children-centric architecture.

Contents

List of Tables:

List of Figures

CHAPTER 1

1.1. Introduction

In the exploration of learning facilities (school) and their role in a child's life, the chapter briefly touches upon the history of school model and origin of currently practiced teaching approach while comparing the efficiency of the model in past time and now. This section also briefly explores the 3 essential categories that the school as a larger system has to achieve, With recent mass urbanization towards the capital in Pakistan, the needs of an urban child have been ignored. The idea of play is innately inculcated in the child from birth that's a medium that works across cultures and times, yet the stark disparity observed in the idea of play and learning has had much impact on how the activities have been segregated and so have the spaces for the two been designed with a very different design languages.

1.2.Evolution of School Model:

The idea of a learning facility shows its traces from the oldest signs of civilizations, knowledge being the necessity of survival to becoming the luxury of the elite, when education was for the elites and amongst the scholars. With the invention of steam engine, the need of society changed and the massive need for trained labor altered the idea of education to an egalitarian model, when the schools backdoor was considered the factory's front door (Sandra N. Samir Labib,2021). The space also took a form of a factory, producing workers that can meet the need of the hour (Perez, Bryan H, 2017). With time and development in environmental design theories of constructivism, humanitarian and behaviorism the approach towards school facilities also being to change (Shaterian, R. (2008) to the idea of school palaces and introduction of learning communities after WW2.(Perez, Bryan H, 2017).These facilities where primarily based on the concept of rote memorization which was the need of the hour then. The books and knowledge were considered to be saved by the ones who remember, which is also the origin of the word "hafiz". All the models were developed in accordance to their time and under the notion to prepare the child to combat life and schools served as a facility that trains children to tackle the challenges of life. Though all the approaches had their pros and cons, and some had a questionable points of interest and origin, but lately the ideas have been transformed from serving the larger system to child-centered approach.

In Pakistan, since the independence till 1990s certain developments in educational sector were promising yet in the past 3 decades or more very little have been done [1], and the infrastructural typology has not been modified. Owing to the recent development global developments in educational facilities, very little implementation has been observed locally and translated into architectural details. with the rising concerns of disparity in education and real world concerns, its essential to question how the two ideas of learning and playing can be combined how can we generate a spaces that is between learning spaces and playscapes i.e. "learnscape". The disparity can be further elaborated based on 3 categories, learn vs play, book smart vs street smart and schools vs playgrounds

1.3. Development and play :

A child of technological age greatly suffers *building syndrome* along with many other disease and deficiency due to the void planted between natural rhythms and a man's pattern of life. The difference has shown severe negative impact on the physical and psychological health of a child, while school serve to be a child's first step of being connected to the world outside home. Designing a facility that establishes the connection between the child and his innate curious nature is a necessity to provide a comfortable and joyful environment. The research will understand the practical and experiential qualities of circulatory spaces in schools. This will help in delayering the connection between the two activities while maintain the decorum details of the two providing a better space for1 child development. The facility design will also be used as an advocate of environment friendly design while serving the functional nature of the program.

1.4. Micro-community, School as a city:

A school as a microcosm of city with multiple systems working in harmony, to develop a concern and responsibility towards shared resources and implanting a sense of being a citizenship amongst young children. This approach helps in observing and answering thd concern as a larger system and not as individual building. Understanding children as the prime residents of this city it's necessary to establish bonds between different age groups and provide a space that teaches the efficient use of resources. This approach to design will explore multiple layers of shared and unshared spaces and opportunities for serendipitous interaction, with in the school vicinity.

1.5.Shaping Self:

Phenomenology in functional spaces is often ignored under the prioritization of functionality, but in hindsight the relational between emotional and physical environment is in separable. The idea is much like a functioning body without a brain doesn't exist. The child is young and hence his/her control over promote reactions is weak, but many of these reactions are embedded in the passive environmental cues. The thesis design is an attempt to align these cues to child innate nature for better development and reimaging a school in 21st century ,within the context of twin cities

1.6.Rational:

1.6.1. Local Conditions:

In Pakistan alone there have been some major developments since independence, after facing a major lack of Hindu teaching fraternity (Roof, David J.2014) the country was able to rectify the situation around 1970s but in the years to come and specially in the past 2 decades the education sector continues to stand on thin ice. With the release of UNESCO's report many gaps in the educational sector were highlighted in comparison to other south Asian countries, and to our misfortune Pakistan has the lowest growth rate in educational sector, (Roof, David J.2014). An Analyses of these numbers and graphs Abids one to take a closer look at the ground realities and propose a retrofit solution for the problem. Unlike many other sectors, the deficiency in educational sector cannot be overcome with few extra funds and resources but to by developing a holistic approach. If not these deficits will act as ingrown diseases the consequences of which are inevitable as these are the facilities that shape the future of a nation.

1.7.Thesis Statement:

Investigating the transformative potential of integrating play-based architectural design principles within early childhood education environments, this thesis aims to bridge the gap between conventional, unidirectional educational approaches and the evolving paradigm of 'Learn through Play.' Through a comprehensive exploration of child development theories and an analysis of their impact , this research seeks to propose architecturally innovative and

joy-infused spaces that prioritize the holistic development of children, challenging the traditional boundaries of functionality and adult-oriented design

1.8. Aims and Objectives:

The thesis is a redefinition of school typology being practiced locally with the aims and objectives based on improving their role on a child's upbringing and bridging the disparity between school and playgrounds.

1.8.1. Aims:

To redefine the nature of educational infrastructure and bridge the disparity between playground and an educational institute. The thesis aims to find a mutual ground for learning to reshape the educational infrastructure to child-centric values

1.8.2. Objectives:

- Explore the character of contemporary schools in urban Pakistan.
- Propose design solutions for schools that prioritize play in school.
- Exploring the ideas and theories of "Learn through Play".

1.9. Research Methodology:

The research methodology for data collection and analysis is as follows:

- **Interviews and Surveys** are conducted among the administrative bodies of schools and parents to know their response to the colocation of schools.
- **Literature review:** in attempts to delayer the connection of a child to circadian rhythm and how to best utilize it literary research is being reviewed. Moreover, the introducing the concept of colocation of schools and incorporation of 4C's in educational discourse will also be developed based on literary research.
- **Case studies/ Precedent Studies** fostering the 3 connections are understudy, in addition to that local purpose-built buildings are also being analyzed to study the current local practices and challenges

1.10. Scope of Research:

The scope of this research lies at the intersection of architecture, education, and child development, offering a comprehensive examination of how the design of school environments can serve as a portal for children to enter the real world. This study encompasses a range of methodologies, including case studies, surveys, architectural analysis. By investigating the impact of diverse architectural features on students' cognitive, emotional, and social development, this research aims to not only understand the link between school design and real-world readiness but also to provide valuable insights for architects, educators, and policymakers. The scope extends to proposing practical design solutions and guidelines that can optimize school environments for fostering critical life skills and personal growth. Ultimately, the research seeks to contribute to the enhancement of school environments as dynamic platforms for students' holistic development, preparing them for active participation in the complexities of the real world.

Chapter 2:

Literature Review

2.1. Evolution of school architecture globally

The evolution of school typology serves as a tracking device to understand and delayer the changing paradigm of society and human perception. In the past the leaning facilities were characterized as academies in ancient Greek , as evident in Plato's academy . Marrou(1946) stated that the earlier educational institutes emphasized on the value of communal learning spaces and philosophical discourse, shaping the architectural elements to facilitate the intellectual development of a child. Transitioning into medieval times the monastic school emerged, each with distinctive architectural language, which was a concrete form of their practiced values. The spatial organization at medieval schools was deeply rooted in religious principles.

The renaissance also added significantly to the evolution of learning facilities. Theses facilities, as studied by Ackerman (1991), were mainly designed by Vittorio de Rossi and were based on the principles of symmetry and proportions reflecting the humanistic ideals of the time. Fast forward to industrial revolution the school typology was now much defined and recognizable as the access of the school was also no longer limited to the elites but education was dealt as a mode of training .Mass education institutes were established. The historical shift towards standardized, utilitarian school building in the era , reflected the shift of society's attitude towards the practical requirements of the time and labor, Tyack and Cuban (1995). Industrialization paved the way for modernism, in the 20th century architectural works of Frank Lloyd Wright and Bauhaus school revolutionized the school architecture. The principles like functionality, flexibility and integration of natural light became the central concept to modernistic school design .

2.1.2. Influence of different cultural and environmental factors:

Cultural and environmental factors have always been a crucial part of architectural response to functional spaces, architecture for education showcases a rich tapestry of styles and influences. The traditional courtyard based typology in Islamic educational institutes explored by Yaqub(2006), highlights the influence of culture in physical layouts, these

layouts not only connect the typology to a particular style but the functional dynamic of the school were also integrated within the new approach. In a cross-culture comparison presented by cuff(1991) highlights the distinction between earlier western and eastern typologies. The western layout focused more on compartmentalized spatial configuration and segregated layouts, while the eastern institutes focused more on open plan layouts and communal spaces. Environmental conditions also play a crucial role in shaping the school architecture. schools or architecture in general adapts to the environment around, and the best material for construction in a space is the material that grows on the same ground., Gissen (2006). Schools are places that are tailored to have open spaces and communal spaces, the impact of external conditions are further amplified in such spaces, hence it is necessary for the structure to respond to the environment around.

2.2. Phenomenology in architectural design

2.2.1. Exploration of phenomenological as in architectural literature

Phenomenology is a theoretical and philosophical framework holding profound implications in the field of architecture, as it is the philosophy lived. The exploration of the phenomena offers a rich multitudes of perspectives, that help one take a deep dive into the intricate relationship between an individual and the built environment. The exploration of the concept is further elaborate by the work of Maurice Merleau-Ponty, in his work “Phenomenology of perception”(1945). It establishes the relation between human perception, space and experience. The perception of space is heavily influenced by the individuality of a being, and to curate a space universally experienced with the similar emotion requires one to curate a sequential play of spaces.

Building on the insights presented by Merleau-Ponty’s , the discourse pf phenomenology is further built upon by the renown work of Juhani Pallasmaa , in “The Eyes of the Skin: Architecture and Senses”(2005). In the writing he explores the phenomenology of space as a collective sum of sensory experiences the spaces awakes. This discourse accentuates the responsibility of architecture beyond the visual curation of a spaces, but to be rather dealt as a holistic experience. The responsibility of an architectural space is beyond the visual quality of the spaces, and to truly transcend its functional role the space has to foster the interplay between an individual and environment , beyond the aesthetic quality of the space(Rasmussen,1959).

In the recent years the concept is further explored by contemporary architects and theorists, where the role of architecture is not limited to the indoor spaces but to the creation of an atmosphere, where the temporal and experiential qualities are user-centered, (Zumthor, 2006). This can be achieved once the user and their mindset is understood in the best possible way, right from the start. Elaborating on this Steven Holl suggest to keep the ideas of perception in mind at the design stage , so the product produced has the capacity to transcend its defined role and engulf the user as a part of it, (Holl, 1996).

2.2.2. Relevance of phenomenology in school spaces:

The application of phenomenology to school spaces is a critical endeavor, as it directly influences the educational journey and well-being of students. A pivotal exploration in this context is the work of Lisa Heschong, notably her research on daylighting and its impact on student performance. Her seminal work, "Thermal Delight in Architecture" (1972), demonstrates the profound effect of natural light on the cognitive and emotional experiences of individuals within educational environments. This research underscores the importance of sensory experiences in shaping the educational atmosphere. Further, Robin C. Moore's research on "place identity" in school design, explored in "Schoolscape: Of Place and Education" (2006), highlights the phenomenological notion that individuals form a profound connection with the spaces they inhabit. The physical environment plays a pivotal role in shaping a student's sense of identity and connection to the educational institution. This perspective aligns with the idea that the design of school spaces goes beyond mere functionality, contributing to a student's overall sense of well-being and belonging.

In contributing to the discourse on phenomenology in educational settings is the work of J. Lippman. His exploration of the "teaching wall" in "Children's Environments for Learning" (1973) advocates for the creation of dynamic, interactive learning environments. This approach aligns with the phenomenological emphasis on the experiential and perceptual qualities of architecture, recognizing that the design of educational spaces significantly influences the quality of interactions and engagement among students.

In conclusion, the exploration of phenomenology in architectural design offers profound insights into the human experience within built environments. From the foundational works

of Merleau-Ponty to contemporary discussions by architects like Zumthor and Holl, the literature underscores the importance of designing spaces that consider the lived experiences of individuals. In the context of school spaces, this phenomenological approach becomes crucial, shaping not only the educational journey but also the well-being and identity formation of students.

2.3. Learn through Play:

In recent years, a paradigm shift has occurred in educational philosophy, emphasizing the integration of play as a fundamental tool for cognitive and social development among children. This section delves into the significance of learn-through-play in school architecture, exploring scholarly perspectives and precedents that illuminate the transformative potential of this approach.

2.3.1. Theoretical Foundations:

Jean Piaget's constructivist theory posits that children actively construct knowledge through interactions with their environment. Play, according to Piaget, is a crucial medium through which children explore and assimilate new information, contributing to cognitive development (Piaget, 1951). Lev Vygotsky's sociocultural theory emphasizes the role of social interaction in cognitive development. Learn-through-play aligns with Vygotsky's concept of the Zone of Proximal Development (ZPD), where children engage in activities that are just beyond their current level of competence with the help of more knowledgeable peers or adults (Vygotsky, 1978).

2.3.2. Literature Review:

Integrating play elements into such environments creates a holistic approach that nurtures both physical and cognitive well-being. R. C. Moore's "Schoolscape: Of Place and Education" (2006) emphasizes the significance of school design in shaping the educational experience. He argues that intentional design interventions, including play areas, contribute to a positive, engaging, and effective learning environment. J. Lippman (1973) explores the role of architecture in "Children's Environments for Learning," asserting that well-designed spaces enhance emotional and social development. Playful architectural features create

environments that facilitate peer interaction and collaboration.Mark Dudek's work in "Architecture of Schools: The New Learning Environments" (2000) discusses the cognitive benefits of playful design. He suggests that environments that promote play stimulate creativity, problem-solving, and critical thinking skills among students.

2.4. Challenges in contemporary school

2.4.1. Analysis the literature on contemporary school design

Th current universally used educational model originates mainly from the factory-model and negates the individualism and identity of its user and time. The reasons behind absence of phenomenology is elaborated upon by the overpowering responsibilities of functionality being posed. The physical ideas associated with the grammar of school building are very strongly imprinted and are based of compartmentalized classrooms and rote memorization (tyack and tobin,1994). These ideas pose a greater hindrance towards the shifting the school typology to fulfill its evolving role with flexibility. Further, the research questions the one-size-fit all approach at schools, as the institute serves to be a fostering ground for multiple individuals the inclusivity and diversity in schools should not be a matter ignored, (anker, 2012)

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2.4.2. Challenges of urban schools

2.4.2.1. Challenges of Urban Schools in Pakistan: A Phenomenological Perspective

Urban schools in Pakistan face a multitude of challenges that require a nuanced understanding, particularly when considering the proposed thesis idea focused on phenomenology within school spaces. Exploring these challenges through the lens of lived experiences and the spatial dynamics of urban schools brings to light critical issues that demand thoughtful design solutions.

2.4.2.2. Circulatory space ignorance:

Urban schools in Pakistan often are strictly functioning on space efficiency and the threshold space for active learning and social development are minimally designed e. The

phenomenological aspect of this challenge lies in the impact on student's experiences, hindering their ability to engage with the learning environment. Colocation, as a solution, emphasizes the efficient use of space, potentially allowing for shared facilities among multiple schools. This approach is discussed in Hertzberger's (2000) work "Space and Learning: Lessons in Architecture 3,"which emphasizes the importance of adaptable and multifunctional spaces in educational settings.

2.4.2.3. Inadequate Infrastructure and Resource Disparities:

The inadequacy of infrastructure in urban schools contributes to resource disparities among students. Phenomenologically, this affects the overall learning experience, creating an environment that may not be conducive to well-being. Collocating multiple schools within the same infrastructure can address resource disparities by optimizing the use of shared facilities.

2.4.2.4. Limited Access to Nature and Outdoor Spaces:

Urban environments often restrict access to nature and outdoor spaces, impacting students' connection with the environment, causing nature deficit disorder. A phenomenological perspective recognizes the importance of nature in the learning experience and collocating schools can potentially allow for the creation of shared outdoor spaces, enriching the phenomenological qualities of the school environment..

In conclusion, addressing the challenges of urban schools in Pakistan through the lens of affordance and creation of joyful spaces will offer a solution that caters to wholistic development of a child. Integrating insights from educational theory, architectural philosophy, and practical implementation is essential to developing solutions that enhance the quality of urban school environments. A thoughtful approach to design that considers the lived experiences of students and educators, coupled with innovative educational theory strategies, has the potential to transform urban schools into vibrant, inclusive, and effective learning spaces.

2.5. Precedent study:

The casestudies explored mainly fcocus on how the ideas of education and play can be integrated to generate facilities the exhibit child-like nature in spaces while answering the functional needs of spaces.

2.5.1. Selection Criteria:

Table 1: case studies selection

PROJECT	TYPOLOGY	CONCEPT	ASPECTS UNDERSTUDY
Rockford Public School by Cannon design	Elementary school with kindergarten	Community building	Spatial relation, zoning segregation
Amar children cultural center	Activity center	Ideal space to play	Transition spaces, child-oriented circulation
After school care center Waldorf school by mono architekten	Elementary school with day care	Architectonic exploration of formal and informal spaces	Zoning of learning studio, gradients of social interaction
Five structure bu guymer bailey		spaces	according to age, graphic cues
School campus de vonk by de pulm	Elementary school with kindergarten		Cluster organization Occupiable voids
Toy story play school by collage architecture studio	Elementary school with kindergarten	Community building at child's scale	Child' perception of architectural elements

2.5.2. Precedent study 1: Rockford Public School by Cannon design:

The school is based on the concept of community building in school, and caters to child's scale in designing details of the structure. The layout exhibits centralized planning while

dividing the central spaces to avoid large monotonous spaces as they discourage activity and interaction amongst students. The central spaces mainly host the ancillary facilities and gathering areas. At the same time it serves ad a threshold towards classroom.
The classrooms are planned in clusters with shared spaces in between, these spaces are aren't dedicated to specific function to allow the student define it as they like. This layout showcases different degrees of social interaction within a school, such approach help in promoting healthier interaction and friendlier environment with the institute. Moreover the fenestration and classroom details give a positive character to the space with reduced sill levels and defined breaking zones the architectonic details of the spaces interact with the child as its primary user.

Figure 1: school plan

Figure 2: interior details

2.5.3. Precedent study 2: Amar children cultural center

The cultural center is made with the ideology to generate the perfect place for children to play. The structure was planned after a workshop and defining how children vire the space

and use different areas. The design hence incorporates many spaces that are function free bt designed with adequate environmental cues to ensure a playful environment. The structure of the building showcases multiple zones and intense that are curated for children.
The central space to the use of climbing structure and stairs on the other side ensure a larger obstacle free area for kids and provides a loop fro movement in the spaces. The rooms labelled as mediatory zones are adorned with intense color or material cues to provide a specific character to each. Moreover the functional zones overlap and interlock while providing peaking holes to see the activity . the scale has also served as a key element in the project and the roofing detail caters to the height variation in different zones according to the function.

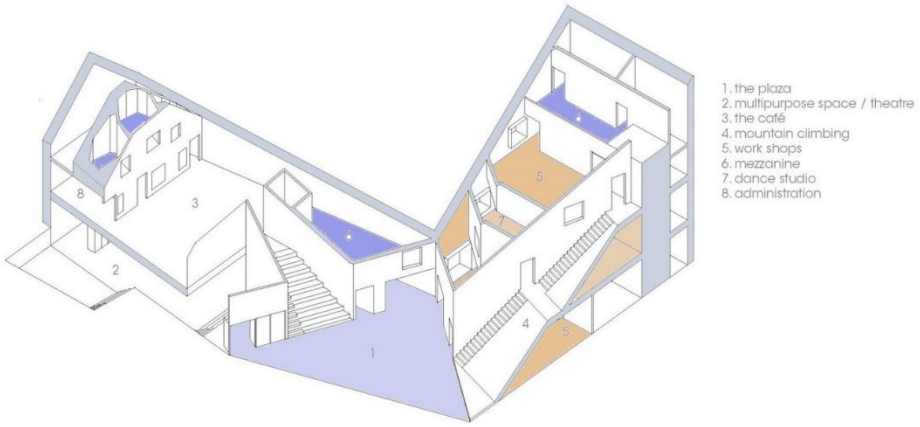

Figure 3: exploded axono of amar children center

Figure 4: section showcasing the scale variation in spaces

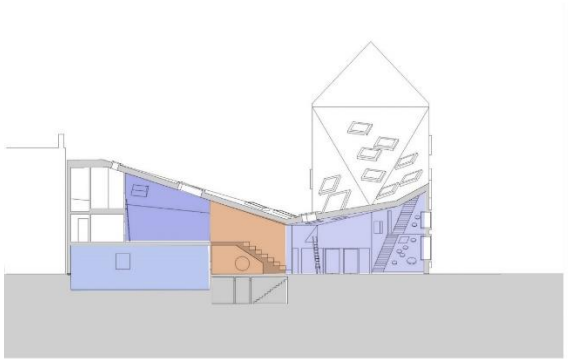

Figure 5: section with functional circulatory and intermediate spaces

2.5.4. Precedent study 3: After school care center Waldorf school by mono architekten

The school and after school center exhibits the difference in its function through its layout. Where in the school spaces the classroom are linearly arranged with corridors running the after school center has a more organic design language that breaks the formality of the space but yet connects the different zones. The learning space is further divided into three zones due to the variation in activity and provides options to carry multiple activities in the same time. The spaces in after care center are divided at the ground level but multiple classrooms can collectively utilize the green terraces accessible from the first floor classrooms. This provides a unique sense of seclusion as well as ownership of these open space that inculcates a sense of ownership amongst students. Moreover the color details of classrooms and the

curve finishing at the corners owes to the use of smooth surfaces and detailing to have a positive impact of students and abides to the principles defined by the aesthetics of joy.

Figure 6: section with learning studio zoning

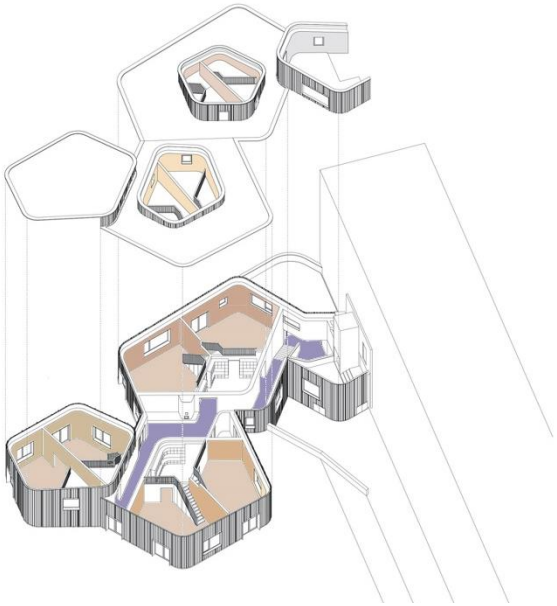

Figure 7: exploded axono

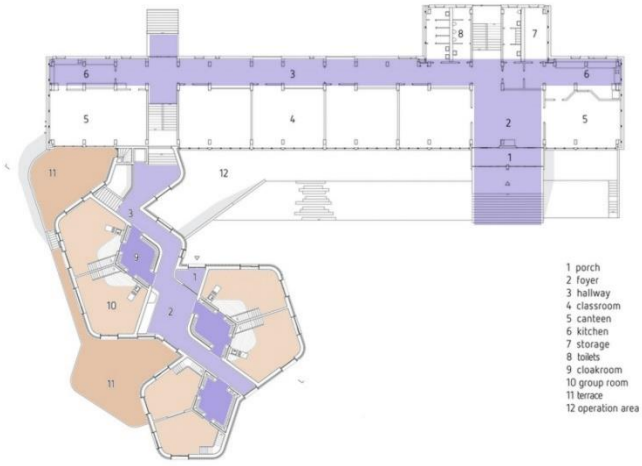

Figure 8: layout plan

2.5.5. Precedent study 4 : Five field play structure bu guymer bailey

The play structure is designed with minimal elements to achieve the idea of affordance, to achieve maximum from this minimalist structure the designers hace used the space and elements efficient while building up on the age appropriate skills for kids the nature of the structure changes and the simplest structure hosts a total of 9 varied activities and 3 paths each of which are based on the age of the user to take on.

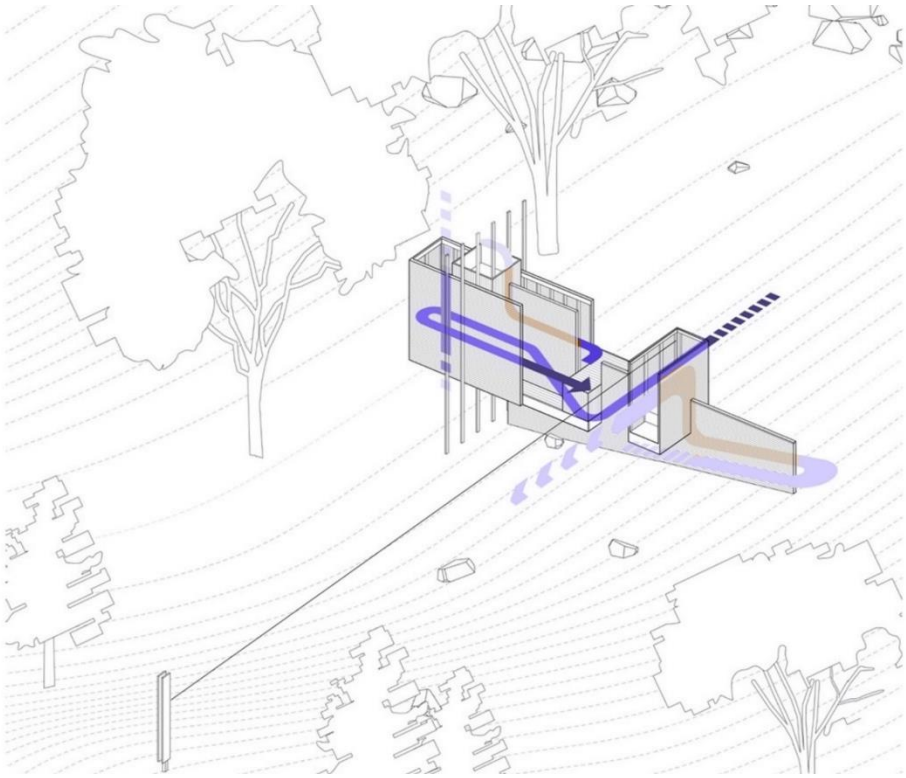

Figure 9: axonometric diagram with access options

The structure provides an open ended space for children to manipulate and use as they like , hence there are endless games and imaginary plays that the structure can host. Moreover the designer intentionally discourages the use of defined architectural elements and those used lead to dead ends and the movement is through this monolithic structure is guided by the graphic cues through out the structure.

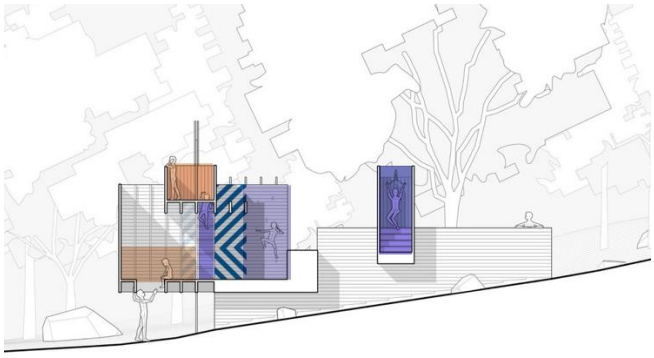

Figure 11: section

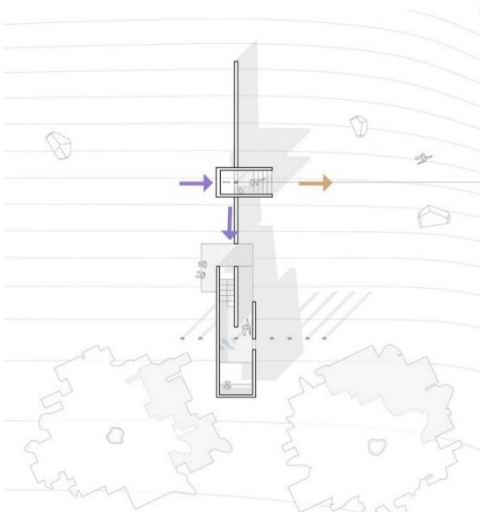

Figure 10: plan

2.5.6. Precedent study 5 : School campus de vonk by de pulm

This project is designed to curate circulatory spaces as social nodes and encourage community formation amongst students and community. The building zones are segregated from each other while having centrally shared space in between to have supervised interaction and make use of the structure after school hours as well. The walls forming the corridors and transitional spaces are punctured with cavities that speak at children's scale and provide buffer spaces in between. The nature of these cavities varies from group spaces to individual nooks, from geometric cutouts to organic ones. The scale of these cavities hinders adult access or utilization of these nooks which further ensure the children's ownership of the feather and serves as their imprint throughout the built structure.

Figure 12: zone division and walls cutouts

2.5.7. Precedent study 6 : Toy story play school by collage architecture studio

The school is designed on a small plot but ensure the ideas of playfulness through the linear and sectional details. The space are flexible with movable walls and overlapping circulatory spaces. The voids in between also add to the charter of the space while providing multiple nodes and framing views at different ends. The example also exhibits a smart use of space and scale by height variation through out the building. The use of sunlight and colors adds to the playful character pf the spaces. Moreover the interior detailing is based on themes of nature which not only provides an efficient space but makes it a child-oriented design, the exploration extends to to designing railing that are inspired by the colors of Indian art and have modules that children can play with.

Chapter 3:

Architectural Program

3.1. Introduction:

The architectural program is rooted in typology, as the research questions the role of typology in both historical and contemporary contexts. The spaces and their architectonic qualities are intended to be modified and layered to scrutinize typology and its influence on young minds. Drawing from Piaget's cognitive development theory, the program details are derived from the stages under study and their significance for specific developmental phases.

3.2. Program development:

Analyzing the educational and psychological theories of the past as presented in the renowned theories, each has been further studied and developed, proving their relevance. However, Piaget's cognitive theory remains the most renowned and accurate of all times. The theory has been expanded into three educational systems: Reggio Emilia, Waldorf, and Montessori theory (Schwartz, 2013). Piaget's cognitive theory is utilized to inform curriculum development. The research approach aims to create spaces and programs grounded in cognitive theory, establishing a link between play and education, and addressing the unidirectionality of the current education system.

Given that the theory divides cognitive development into four stages—sensorimotor, pre-operational, concrete operational, and formal operational—the two most pivotal are concrete operational and pre-operational. The description of these two stages suggests the varying roles of different types of play with age, as illustrated in figure7and figure8.

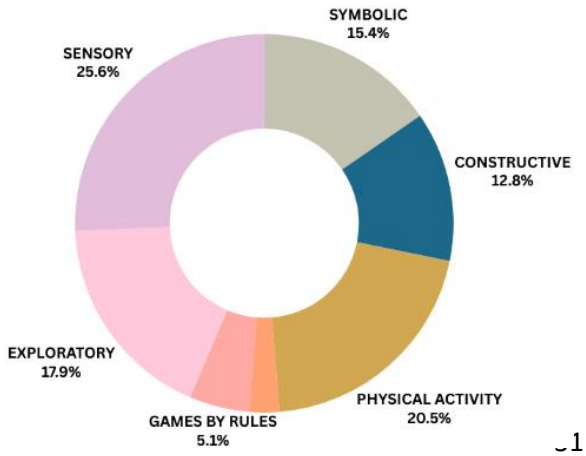

Figure 13:types of play impact on cognitive growth at pre-operational stage

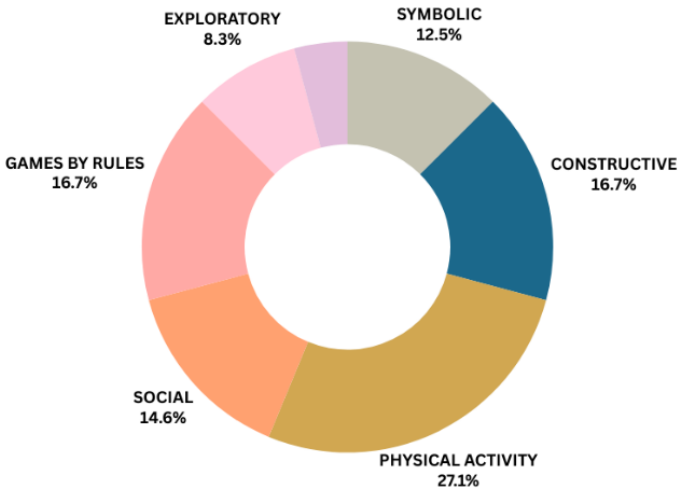

Figure 14: types of play relative impact on cognitive growth at concrete operational stage

To generate spaces aligning with the role of play, various activities are designed to fulfill multiple goals corresponding to different play types, as illustrated in Figure 9. Additionally, the need for physical activity intensifies as the child advances from the pre-operational to the concrete operational and formal stages. The activities are also organized in a similar format to ensure variety in physical activities throughout the day.

3.3. User:

As discussed earlier, the majority of cognitive growth occurs during the preoperational and concrete operational stages of a child's development (Burke, Catherine, 2005). Aligned with the thesis's intent, the approach of learning through play is most effectively applied during these stages. Therefore, the target age range for users is 3 to 11 years, narrowing the scope of the school to kindergarten and elementary levels. The programs are designed based on the types of play and their respective impacts. The pre-operational stage involves more sensory and make-believe play, with the need for vigorous physical activity being of a shorter duration compared to the concrete operational stage (6 years to 11 years), as illustrated in Figure 9.

In response to this context, a facility will be designed to accommodate a total of 450-500 elementary school students, along with a kindergarten for 50 students.

3.4. Developmental stages:

The two age groups differentiate in the developmental goals which dictates the activities suitable at the stage formulating the program brief accordingly, these takeaways also play a crucial role in designing the circulatory and landscape details for primary and pre-school.

Table 2: the developmental goals and activities

Developmental Stage	Developmental Tasks	Activity/ Experiences	Supportive Environmental Features
Middle childhood (6-12 years) CONCRETE OPERATIONAL	- Friendship - Concrete operations - Skill learning - Self-evaluation	- Purposive social interaction - Team play - Educational activity - Risk-taking physical activity - Restorative experience for emotion regulation	- Adventure play properties (both loose and fixed) - Safe place and equipment - Sufficient places and facilities for group activities (e.g. soccer,handball) - Clear rules of place use and spatial organisation - Educational related tools (e.g. reading material, counting tools) - Adult's support to gain new cultural knowledge - Restorative qualities of place, such as privacy, relaxing atmosphere

Developmental Stage	Developmental Tasks	Activity/ Experiences	Supportive Environmental Features
Early childhood (3-6 years) PRE-OPERATIONAL	- Gender identification - Early moral development - Peer play	- Climbs with confidence - Increased speed of run - Solitary activities - Physical balance activity (e.g. rides a tricycle) - Recognising the spatial concept (behind, under, in front of)	- Flexible elements (e.g. rocks, logs, branches) - Loose objects including leaves and twigs that support diverse play - Supporting facility for climbing (e.g. ladders) - More structured solitary games that invite interaction (e.g. hide and seek, castle with window) - Facility for gathering and interaction (low seat and desk) with same age children

3.5. Types of physical activity:

Physical activity, for the purpose of this research, is categorized into three types based on their impact on the child's physical well-being:

- Light physical activity
- Moderate physical activity
- Vigorous physical activity

These categories are developed based on research provided by raisingchildren.net.au. Additionally, the recommended duration of engagement in these activities varies according to age, as outlined by the Center for Disease Control and Prevention. Children aged 3 years up to 5 years should be physically active for at least 3 hours each day, including one hour of energetic play. For children aged 5 years up to 12 years, participation in one hour of moderate to vigorous physical activity, along with several hours of light physical activity each day, is

recommended. Moreover, at least 3 days a week, these activities should include vigorous activities and exercises that strengthen muscles and bones.

3.6. Program Details:

FUNCTION	SPACES	PLAY
LECTURE	LEARNING STUDIO	MASTERY PLAY
INSTRUCTIVE ACTIVITY	WORKSHOP AREA	CONSTRUCTION PLAY MASTERY PLAY
DIGITAL SKILL LEARNING	COMPUTER AREA	DIGITAL PLAY
PRESENTATIVE / PERFORMATIVE ACTIVITY	THEATRE SPACE + ART STUDIO	ROLE PLAY SOCIO-DRAMATIC PLAY
READING SPACE	LIBRARY NOOKS	LANGUAGE PLAY
SMALL GROUP ACTIVITY	INTIMATE NOOKS COLLABORATIVE NOOKS	SOCIO-DRAMATIC PLAY CONSTRUCTION PLAY ROUGH AND TOUGH PLAY
COLLECTIVE ACTIVITY	LARGE PLAY SPACES+ GYMNASIUM	LARGE MOTOR PLAY
CIRCULATORY SPACE	PHYSCIAL PLAY NOOKS AND OBSTACLES	LARGE MOTOR EXPLORATORY PLAY
OUTDOOR AREA	PLAYSCAPE GROUND SPACE NATURE SCAPE	EXPLORATORY PLAY LARGE MOTOR PLAY SOCIAL PLAY

Table 4: program and play (primary school)

FUNCTION	SPACES	PLAY
LECTURE	LEARNING STUDIO	MASTERY PLAY
INSTRUCTIVE ACTIVITY	WORKSHOP AREA	CONSTRUCTIVE PLAY MASTERY PLAY
VIDEO WATCHING	SCREENING AREA	DIGITAL PLAY
PRESENTATIVE / PERFORMATIVE ACTIVITY	THEATRE SPACE	DRAMATIC PLAY CONSTRUCTIVE PLAY SOCIO-DRAMATIC PLAY
SMALL GROUP ACTIVITY	INTIMATE NOOKS COLLABORATIVE NOOKS	LANGUAGE PLAY SYMBOLIC PLAY
COLLECTIVE ACTIVITY	LARGE PLAY SPACES	ROUOGH AND TOUGH PLAY
OUTDOOR AREA	SANDPIT WATER PIT NATURAL POCKETS PLAYSCAPE	EXPLORATION PLAY RECAPITUALTIVE PLAY LARGE MOTOR PLAY

Table 3: program and play (pre-school)

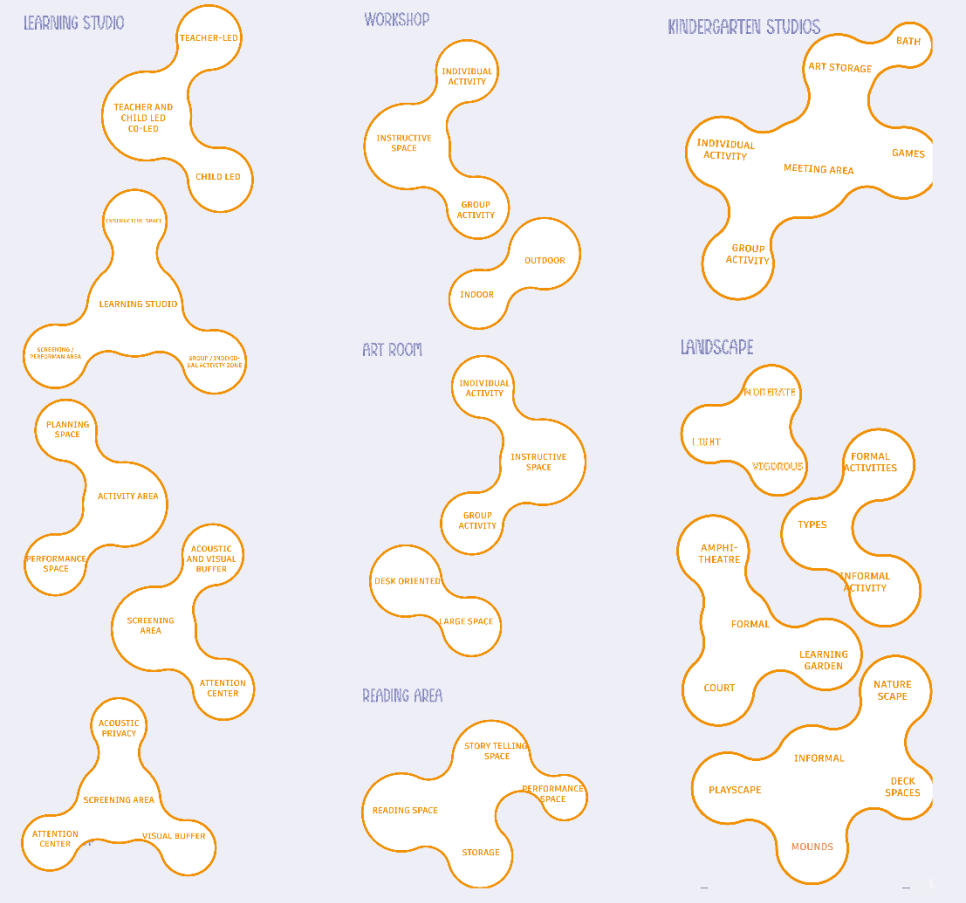

Figure 15: Program and zone breakdown

SPACES	PER STUDENT	NO. OF STUDENTS	AREA REQUIRED
PRE-SCHOOL			
INDOORS	40 sq.ft	60	2400
OUTDOORS	100 sq.ft	30	3000
SCHOOL			
CLASSROOM	32 sq.ft	240	7680
ART STUDIO	38 sq.ft	40	1520
PHYSICAL ACTIVITY AREA (INDOORS)	42 sq.ft	40	1680
MULTIPURPOSE	18 sq.ft	300	5400
LIBRARY	40 sq.ft	40	1600
MEDIA CENTER	40 sq.ft	40	1600
ADMIN AREAS	1500 sq.ft	1	1500
CIRCULATION	5270 sq.ft		5270
AREA			32,656
OUTDOOR AREA	125 sq.ft		37500
TOTAL SITE AREA			69660

Table 5: space required per student

2.4.3.7. Programs and Areas:

The standards for spaces are referred from time saver standards.

PROGRAM	AREA sq.ft	No. of Units	TOTAL sq.ft
Class room	800	25	24,000
Staff room (for 8)	250	2	500
Staff room (for 5)	150	4	600
Bathroom	25	30	750
P.E. Ground 1	7000	1	7,000
P.E. Ground 2	5000	1	5,000
P.E. Ground 3	6250	1	6,250
Clay workshop	1200	1	1,200
Material workshop	1400	1	1,400
Educational Workshop	1400	1	1,400
Library	1600	1	1,600
Café cabin	400	1	400
Theatre	1000	5	5,000
Digital lab	1200	1	1,200
Admin Spaces			
Principle's office	200	1	200
Accounts office	150	2	300
Admin office	150	2	300
Reception	100	1	100
Waiting area	300	1	300
sickbay	220	1	220
Supporting Areas			
storage	1000	1	1,000
Parking spots- cars	162	15	2,430
Parking spots- van	180	6	1,080

Total Area			
Total			62,230
Circulation 20% of total			12,446
Sum total			74,676

Chapter 4:

Site analysis

4.1. Introduction:

As per the program brief and research documented in the former chapters, the site selection criteria was defined by multiple aspects of the research. The site has major factors that ensure the feasibility of this project. Its location and accessibility to residential zones of twin cities serves to be one pf the key aspects, that would benefit a larger number of users while ensure a positive impact of the facility for its primary and secondary users. The modified typology of school is one of its kind in the context which will serve as a prototypic example for future primary educational infrastructure. The site is to be chosen in Islamabad to serve as the initiator of change and attract the attention of authorities and private facilities to reanalyze the current practices in the country. Hence the site is selected in H-8/1, which is an institutional sector, the vacant land is opposite to H-8 park through which the I-8 sector gets connected to the site.
The current site is beside Jamia Salafia university, with dense wild vegetation and a drainage nallah passing through it. The site is accessible at 2 sides of the plot which can aid in dividing the traffic and user influx to the site.

4.2. Site criteria:

To propose a learning facility understanding the legal as well as traffic concerns served to be the driving force in selecting the site also ensures to abide by the national development manual of Pakistan The basic guides for selecting the sire included the following aspects:
- Accessibility
- Safety
- distance range
- location
- natural features
- neighborhood:

4.3. Site and thesis statement:

The thesis aims to establish a new approach to bridge the disparity of learn and play in a child's educational experience while combining the two through architectural reforms. This will distinctly make the idea of child-centered architecture typology in Pakistan's context as an example. The approach will also raise questions in policy sector for educational methodology reforms and city development, urban scale projects and ideas to create better cities for future generation, by considering children amongst the primary stake holders of the spaces with the city.

4.4. Site location:

The site is located in H-8/1 and can be accessed from service road connecting the Pitras Bukhari road to Sufi Tabassum road. The site is adjacent to the Jamia Salafia university and other necessary facilities. Moreover, the site on the north western edge is accessed by street 2 originating from street 2.

Figure 16: marco plan

4.4.1. Accessibility:

The sites for school typology are comprehensively described in the National development manual. The document describes the site to be located in 6km vicinity to a mosque, hospital and public transport stops. The proximity of the site to Al-Shifa international hospital, serves to answer any safety concerns or any future hazard that children might face. Moreover, the metro station is 300-350ft away from the site which connects the horizons of the site to the

edges of twin cities. This serves to the viability of the site and provide the staff sustainable and economically viable solutions to access the site .

4.4.2. Road networks:

The site is accessed on two sides of the plot south-east edge is accessed by two-way service road, the opposite side is accessed by a two-way street. The service road connects sufi road to pitras bukhari road, hosting the access to edhi home, PCRWR and International Islamic Relief Organization. The street 2 serves as a access road for PPMI complex, SGA Working Women Hostel and Umeed-e-Noor. The service road serves as the main access to the site, the road caters to minimally used facilities due to which the road doesn't have any traffic congestions through out the week.

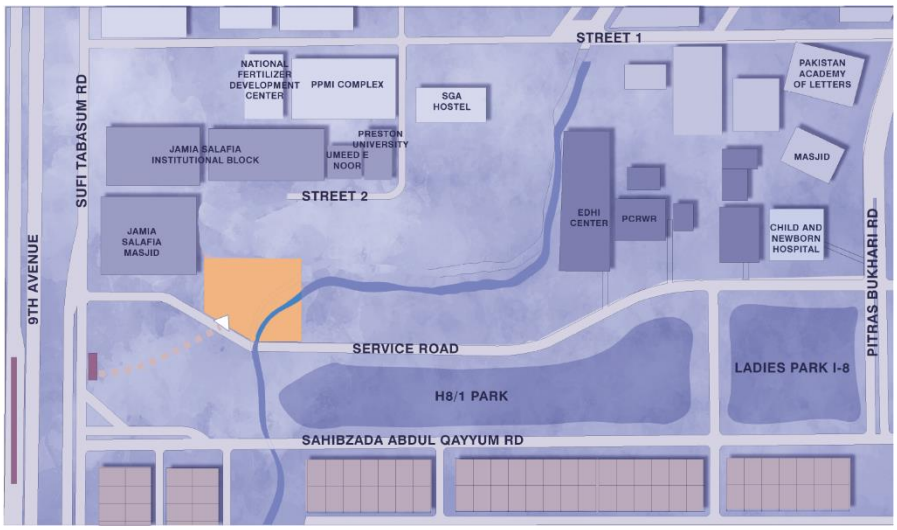

Figure 17: messo access plan

4.4.3. Contextual nodes:

The site for a school should have accessible infrastructural facilities and considerable user influx to the site. The site chosen is across a park that is frequently used in the afternoon and evening hours. The north-west end of the site is currently used as an informal basket ball and cricket pitch, which communicates the current trends of the site and the residents around the site. In addition, the pakdandi on the site also communicates the user movement and use of the site, this has also cleared up the vegetation and has served as a reason to reduce the junk and dump on the site.

4.5 Site and program:

Being a primary school in a metropolitan city, the site needs to be serving as a buffer form the hustle of the city, and foster an adequate sense of tranquility. The current dense vegetation, water stream and limited traffic influx with topographic detail serves add to the serenity and tranquility of the site.

4.6 Site study and analysis:

The site is naturally rich topography of the sites serves as a guiding tool. The drainage through the site divides the site into two part and provides distinction between the facilities to be planned with minimal access and reduced proximity. Few of the other key features of the site are as follows:

4.6.1. Site orientation:

The site is south-east oriented which limits the harsh sunlight away from the primary entrance points. The eastern side of the sites is naturally adorned with the lake puncture and thick vegetation around it, the western end also protects the core of the site through dense wild vegetation.

4.6.2. Site topography:

Topography: the site has a contour difference of 7’ across the site, till the constructable area limits. The contour slope shows a rapid dip near the nullah and then the contours rise back again. Hence both the roads connecting to the site are at an elevation difference of 7ft. The entry to the site from the service road is at a lower end compared to the end of the site, connected to street 2.
Nallah: the nallah cutting through the site is at a level difference of 10ft and has recorded on average a water level rise of maximum 5ft . this suggest the nallah to be a save natural feature to use in the design, while treating the water minimally, as the nallah caters to rain water alone, as described by Ayesha Munawar, 2023.

SECTION A-A

Figure 18: site section

SECTION B-B

Figure 19: site section

4.7 Adverse aspects of the site :

The site is left abandoned for a long time due to which a few adverse aspects have become a part of the site's identity.

1-Safety concerns of the service road, as a considerable length of the site is adjacent to un-used area, this often serves as an opportunity point for illegal activities and incidents .

2- The availability of contours and nullah would require added care to propose a design that amalgamates and respects the natural make-up of the site.

4.8 Design consideration to nullah

The general water condition as to be treated and the land and stream edge has to be redesigned to propose a suitable solution fro children, moreover CDA has launched a project on nallah lain which serves as the basis of incorporating nallah in the designed spaces. Due to the current condition of the water in the stream the wet lands have to be modified to purify the rainwater and use it in growing desired plants species. These design strategies will be both economical and sustainable for the environment in the longer run.

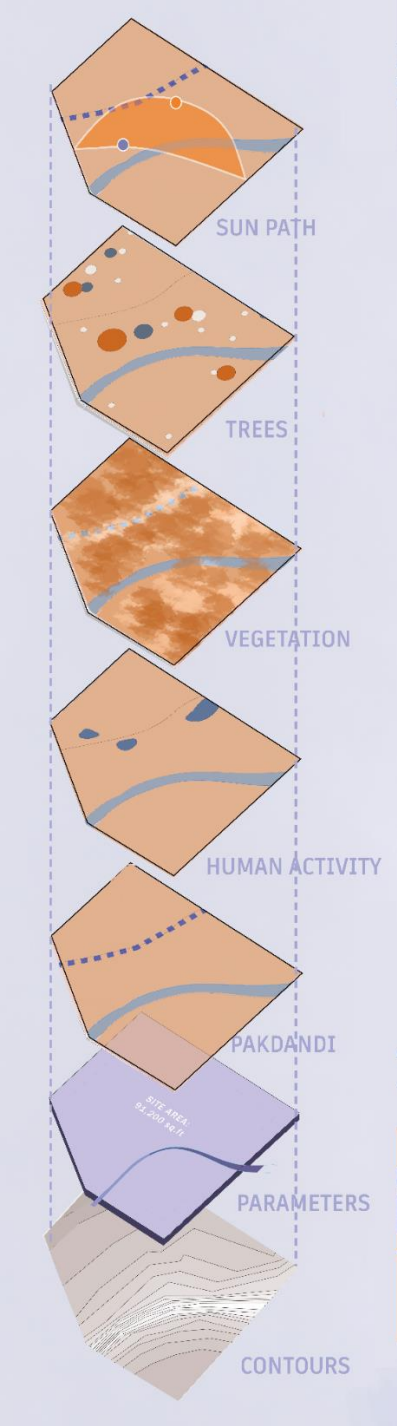

Figure 20:site analysis layers

Chapter 5

Design Development

5.1 Introduction:

The design translation is the amalgamation of the research , thesis statement, local conditions and takes aways of the programs and site. The idea originates from the space for a child , and exploring the study of affordance in space to cultivate a child's innate curiosity. The approach shifts to delayer the co-existence of functionality and experience in a school spaces in attempts to establish harmony between playing and learning. The idea is further dissected based on the connection established between learning and play with the help of theories and methodologies in the past. To translate this into a space the idea has been adopted from the concept of streets. While exploring and understanding how streets serve as playgrounds for different age in our context. Though the dynamics of streets and its urban life is complex, so for this project the streets and their connections in between will only be analyzed in terms of play and the activity will be studied in different areas of the twin cities to delayer the design language and elements. That language then translates into the built school building. To establish an in depth understanding of the matter, literature, case studies and scale exploration exercises in order to generate a space that promotes the child's playful nature and supports the multi-layered nature of education.

5.2. Architectural concept:

Figure 21: collage

The idea of street transforming into a playground and offering a wide variety of activities to co-exist, while essentially being a circulatory space make it a suitable concept to develop into a building that bridges learning and playing in the context of Pakistan.

5.3. Design translation:

The design translation phase includes the following factors and topics being explored through out the design proposal:

- the play of scale
- the Aesthetics of joy
- the play of color
- the playful architectonics, via the theory of affordance

while based on the conceptual upbringing of the project the design elements include the following.

5.3 The conversion of discourse into program:

The idea of play when becomes the central concept and driving idea for the project the design proposal hosts a set of spaces and spatial specifications that cater to all the 11 types of play mentioned in chapter 3, while describing the programs. This along with providing freely flowing spaces generate a space that ensure a child's participation, ownership and safety with in the horizons of the design proposal. As the thesis aims to delayer the functional spaces in order to find the gaps in between the role of a school and playful spaces.

5.4. Design development process:

The design process begins with the exploration begins with exploring the linear nature of streets and the pockets that get formed with time. These organic pockets are formulated by environmental cues, while using the similar linear planning as the guiding principle, the spaces are modified by adding curve pockets and green spaces in order to ensure acoustic segregation and dividing the linear blocks into different zones.

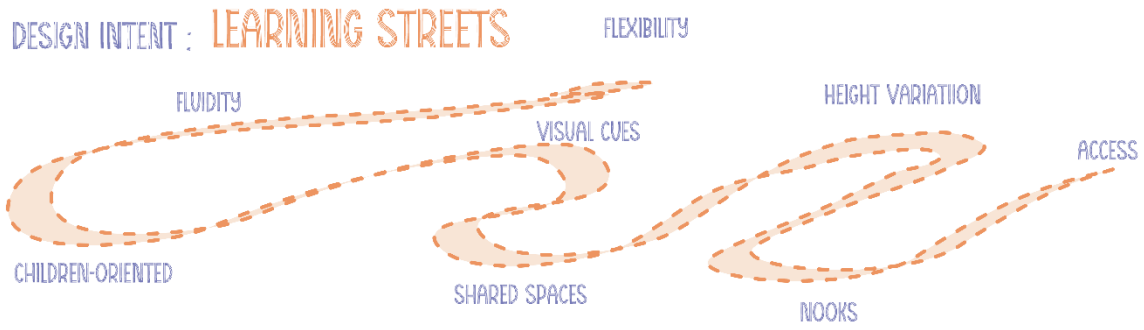

Figure 22: process

Moreover, introducing main circulation at a perpendicular to the blocks provides an opportunity to divide the blocks programmatically as in figure below. These strategies combined generate a space that provides fluid movement between zones while ensure the requirements of individual zones as per their function.

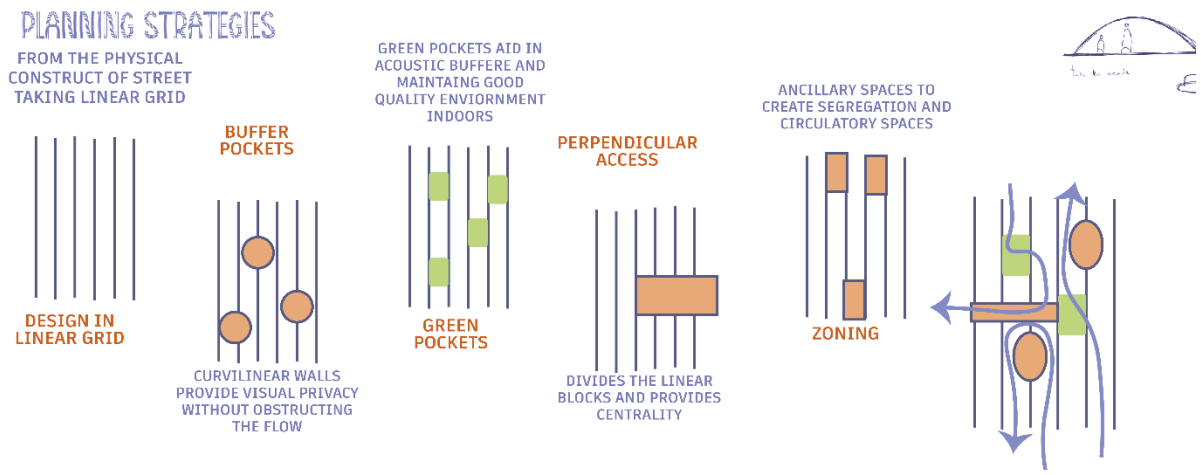

Figure 23: process

Figure 24: process models

5.5. Site analysis:

The site being located in H-8 depicts similar land use around the site. The different aspects of the site that influence the planning includes.

Micro site analysis:

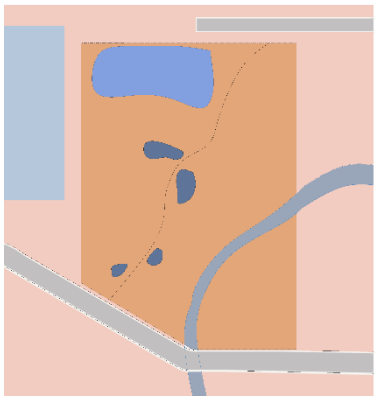

Figure 25: site activity

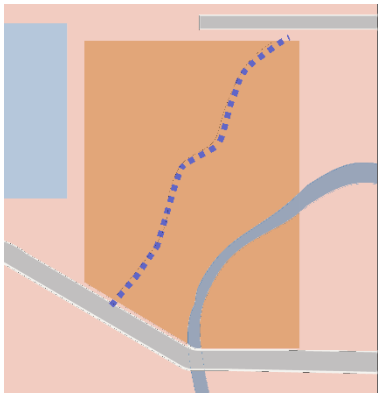

Figure 27: pakdandi

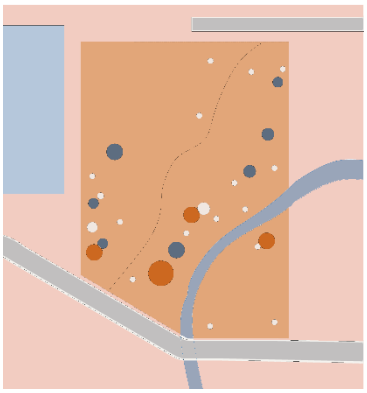

Figure 26: plantation on site

5.5.2. On site zoning :

The defining factors in planning on the site include, the contour and access details .To finalize the massing on site the combination of site cues and different massing ideas have been explored.

Figure 29: grid

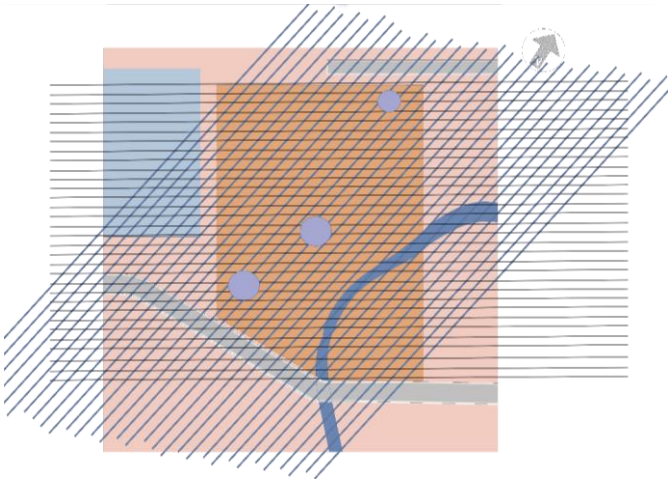

Figure 28: site zoning

The slope and water stream tend to take the primary focus in dictating the design process. The building is therefore divided into 2 parts i.e. pre-school and primary school, while leaving space for playground and open areas in the Northeast which serves to be the ideal orientation for playscapes. The angled orientation and dividing the mass brings ones focus and attention towards the water stream celebrating it as a welcoming feature of the site

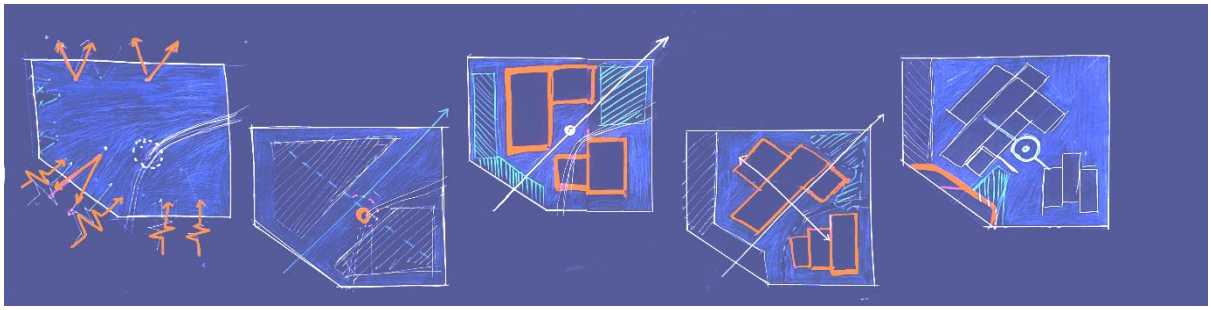

Figure 30: site process sketch

Chapter 6

Architectural design

6.1. Introduction:

The design of the educational facility is proposed in H-8/1 opposite to a park space to set it up as an exemplary institute that combines the discrete domains. The proposal is a product of the scientific research and the study of street play in Pakistan. The design language and elements are an abstraction of street but designed in accordance to the research and theories talked about earlier.

6.2. Design description:

The design address the concerns of traffic congestion at the site selection level and to avoid the added hassle in the future, a lay-by lane is incorporated in the design and the drop-off road is excluded from the boundary of the institute to ensure a safe environment. Separate parking has been provided for the staff and parents on special occasions. Moreover the water stream flowing through the site is also incorporated in the design to enhance the landscape quality and maintain the natural character of the site.

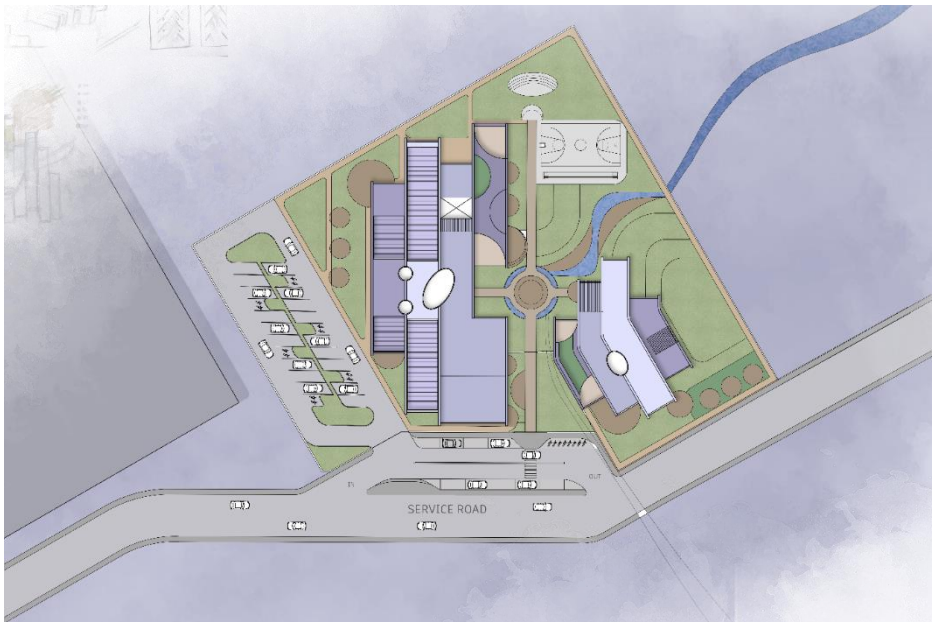

Figure 31: master plan

6.3. thesis statement justification

The design ensures that amalgamation of the 2 concepts by utilizing theories that bridge the gap between play and learning and formulates a solution for active learning in classrooms and beyond. Through out the process the references, case studies and theories have been carefully selected to generate a harmonious solution that answers the needs of today's child and offers a solution that explores the purpose of school beyond studying but describes it as a institute for child's wholistic development.

6.4. Final design:

The final design outcome shows the use of multiple design elements and zoning to generate spaces that speak to children and encapsulate the essence of affordance. The threshold space celebrates the landscape attributes of the site while this also serves as the divider between the 2 age groups. The centralized design further provides a sense of direction and eased navigation for students.

The classroom has been exploded into 3 zones that are mutually shared amongst different classes and each serve to address a different purpose and need according to the grade.

Moreover the auditorium and preschool entrance is accessible from the outside to avoid any unsupervised interaction amongst adults and the students attending the school.

The ground floor shows a more active planning layout where as the first floor show cases more static zone to ensure smooth flow of both the functions. The circulation spaces at instance hinder adult access but provide sufficient space for children to pass through, building on the idea of providing spaces, where *adults can walk but children can fly*.
The preschool differentiates in terms of zoning and gathering spaces as at the younger age children are always accompanied by a faculty member and is not generally left alone. Moreover at that age the crucial learning skills also varies which is way the design details and programs of the two showcase those difference

Figure 32: ground floor plan

Figure 33:First Floor plan

The spaces are developed based on the zones study in figure 15, where inorder to locate them within open plan layout the areas have been provided with varying level of acoustic and visual privacy based on the intended useage.

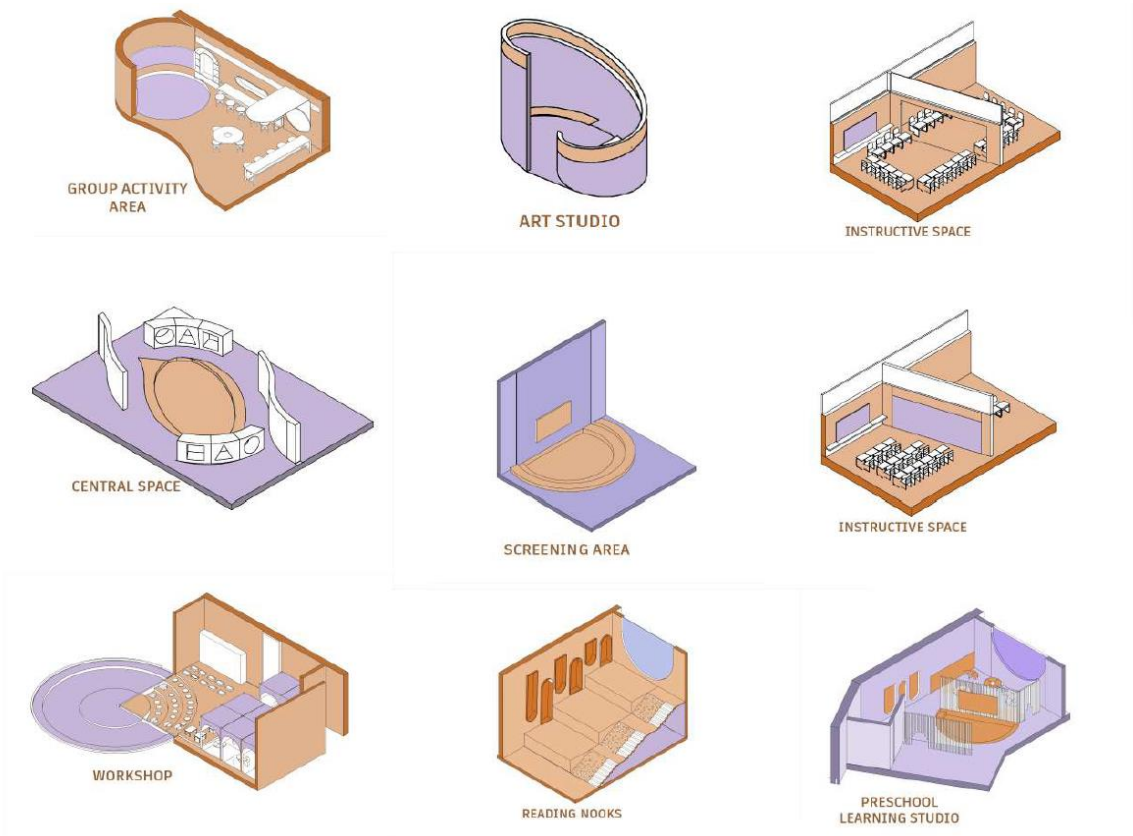

Figure 34: Space sketches

The sections further highlight the vertical connect between spaces and the varying wall elevation details. The instructive spaces are located in the first floor to provide acoustic privacy and generate the opportunity to keep them naturally lit throughout the day using automated louvers.

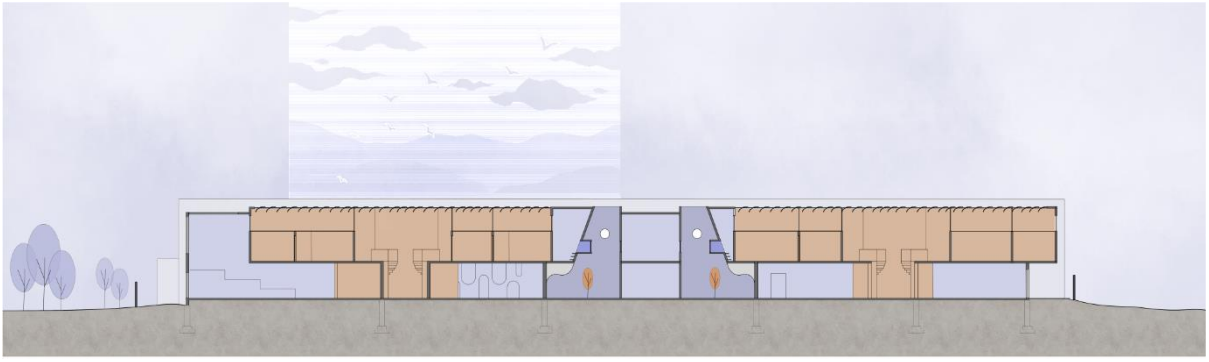

Figure 35: Section A-A'

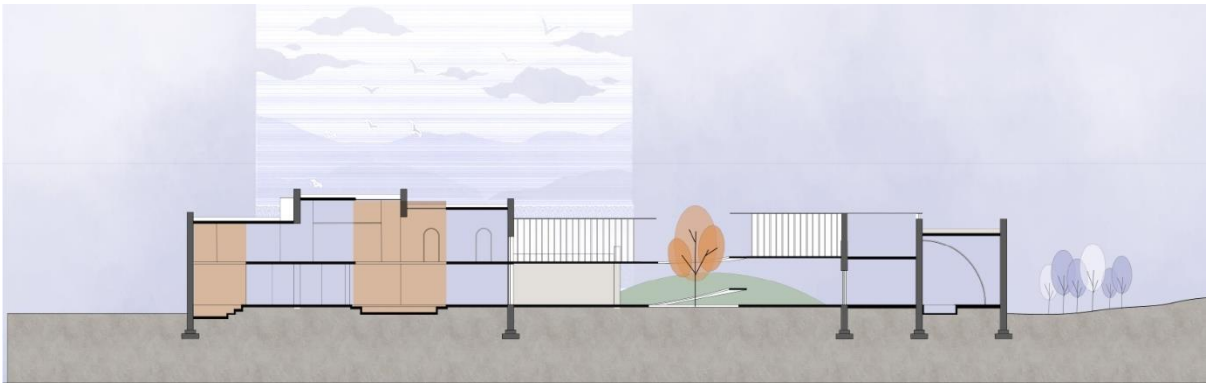

Figure 36: Section B-B'

The 2 blocks are connected by the water stream and vegetation which also serves as the entrance threshold this provides a better opportunity to ensure safe and supervised environment for children to explore and learn.

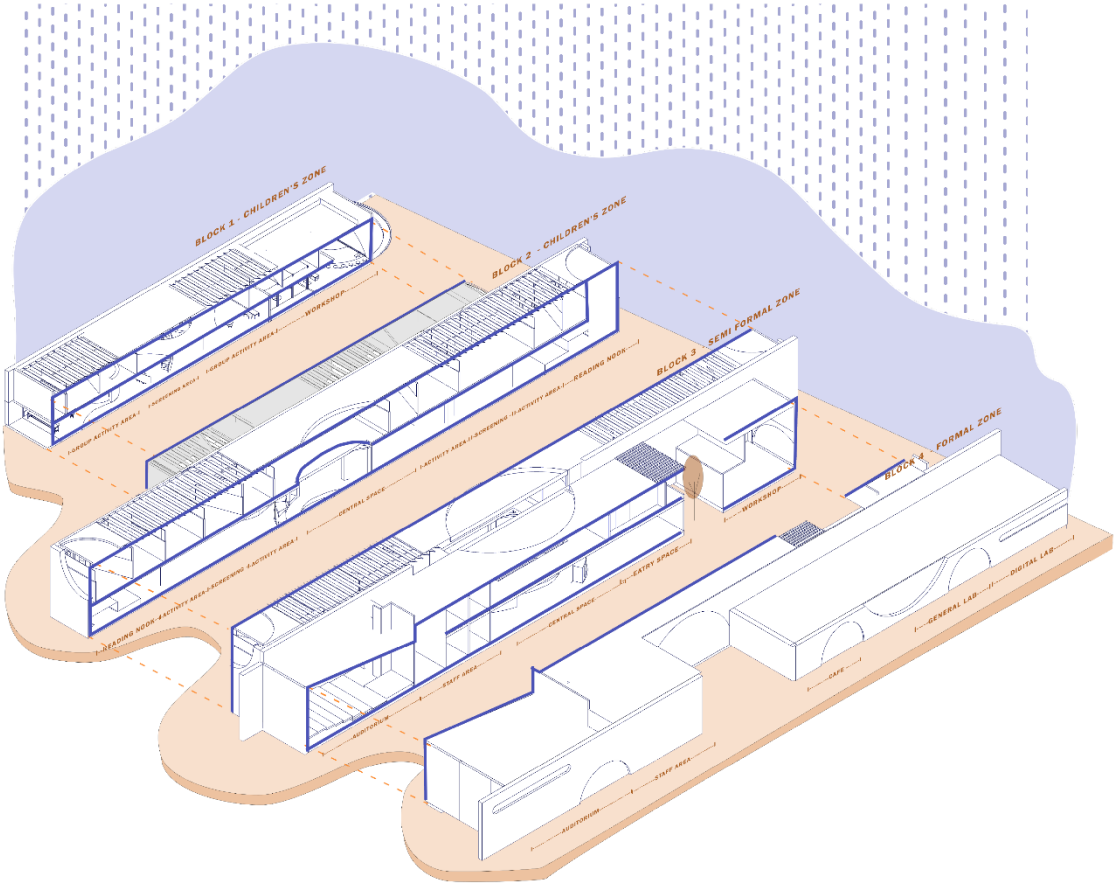

Figure 37: Exploded Axonometric Illustration

The figure 37 highlights the changing scale and connectivity between spaces each linear block further serves a particular purpose while hosting the admin and auditorium at the start and keeping children oriented spaces at the farther end of the block.

Figure 38: Render 1

Figure 39: Render 2, reading area

Figure 40: render 3

The interior and the exterior both exhibit the use of popping colors in amidst monolithic finishes. However the interior is more minimalist in appearance while the exterior is finished in brick. The fenestration details are drawn by the similar play of lines and circles as used in the plan.

Figure 41: render 4

The figure 42 shows a few scenes from the spaces generated and encapsulte the intent of the thesis bridge the disparity between a playscape and a school by generating systems and spaces to ensure children's ownership of their space. While encapsulating the concept of a street in a school where multiple activities are hosted in the pockets and negative spaces, and all can occur simultaneously.

Figure 42: Comic Illustration

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