CITY OF KIDS

DESIGN KINDERGARTEN

WENYI ZHANG

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CITY OF KIDS

DESIGN KINDERGARTEN

A Design Thesis submitted to the

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of North Dakota State University

by Wenyi Zhang

In partial fulfillment of the requirements for the degree of

Master of Architecture

Primary Thesis Adviser

Thesis Committee Chair

May 9th, 2014

LIST OF FIGURES AND TABLES

ABSTRACT

This thesis project, City of Kids, examines the question that how can architectural elements optimize the traditional method of early childhood development. This thesis proposal primarily focuses on the impacts of spatial arrangement and program relationship of a designed kindergarten. The site for this project located at City of Hangzhou, Zhejiang Province, China. The theoretical premise/ unifying idea that directs the investigation is rational architectural space and meticulous programming promotes kids' experience and early development in their childhood. The importance and practical implication of this project is to create a prototype of renovated kindergarten in China that brings more opportunities and possibilities to the education for kids.

Keywords:
Early Childhood Development
Architectural Perspective
Programing
Kindergarten
Education

PROBLEM STATEMENT

How can active school programming and associated architectural elements optimize the traditional method of early childhood development?

STATEMENT OF INTENT

STATEMENT OF INTENT

Typology:
Kindergarten

Claim:
Dynamic school programing and associated architectural space are essential to innovate the conventional way of early childhood development.

Actor: Active school programming and associated architectural design
Action: Architecture innovation
Object: Kindergarten

Premises:
Active school programming and the linked architectural design of a kindergarten could promote the children's experiences on campus. Through innovations, designing a kindergarten with thorough programming and rational special arrangement. While home schooling remains unpopular in China, kindergarten education plays a very important role in children's early childhood development. It is the place that influences how children perceive the world the most.

Unifying-Idea:
Dynamic school programing and associated architectural design promotes children' experience and early development in their childhood

Site:
Hangzhou, Zhejiang, China

Justification:
In recent years, a new wave of "baby blooming" has effect China in several ways (Kuo, 2013). Many cities like Hangzhou are in exigent demand for more available educational resource aimed at kids aged between three to six years old. The fact that the mass public has always been criticizing the conventional kindergarten system in China, new program for early childhood development is very much needed at this moment. Through the daily interaction with the architectural space, this thesis project focuses on children's experience in the kindergarten. After all, kindergarten should become the extension of homes or playgrounds other than a discipline institution.

THE PROPOSAL

It is believed that children are the rising sun of a nation. Early childhood development for young kids is essential for their future progression. Kindergarten, the most popular early childhood education in China, should ensure the healthy environment and provide proper guidance for children at young ages.

Hangzhou, Zhejiang Province, the fourth largest urban area in China, its population just reaches a new peak by the end of 2012, a little over 8 million. When I grew up, I never thought my hometown would become a metropolis city like today. The rolling urban expansion is overwhelming by any means. While most citizens are satisfying with the triumphs achieved on the way to being developed, certain practical issue exposed along the road should not be neglected. One critical concern that interests me the most is the lack of early childhood education resource. In general, the overall quality of kindergarten education in China is far from sufficient yet the current quantity of schools leave people even fewer options. Over the years, I have heard many friends of my family criticized the unreasonable amount of effort one has to put, just to make sure his or her child would get into a decent kindergarten.

As the city of Hangzhou is expanding with the fastest speed it has ever been, new construction sites are taking place simultaneously all over the urban area. The city impresses me with its clustered building complex; while at the same time, it frightens me with the lurking uncertainty. Urban residences are now living in a concrete jungle that keeps on growing superior and more sublime. To me, a large-scaled architecture design intimidates fully-grown adults. In most cases, high-rise and enormous structure does not appear friendly from the first sight. It is believed that architecture design stimulate on how children perceive the world. Will the ongoing inorganic development influences the future generation at the very early stage of their life? In which way could we ensure the healthy and sustainable development for the children of this millennium?

In this thesis, city of kids, I will examine the question on how can architectural elements optimize the conventional method of early childhood development. Within the modern urban context, kindergarten should be kept with a child-friendly scale. Dudex (2001) believed that texture, sound, light and color would challenge and inspire children at a young age. By innovating the architectural elements and activity programing of the designed kindergarten, new prototype of kindergarten education could be established in China.

A USER/CLIENT DESCRIPTION

Children:

Kids registered in the kindergarten will spend most of their weekdays in the designed kindergarten. Most kids in the kindergarten live in the nearby neighborhood, Binjiang District. Some children may come from relatively distanced area due to the parent's work. Most children are aged from 4 to 6 in the kindergarten.

Parents:

Parents drop and pick up their child on weekdays at the entrance rest area. Sometime, they will be invited to participate parents' day or a meeting with the teacher to talk about their child's performance in kindergarten.

Faculty:

Principle of the kindergarten will supervise the teachers, faculties and workers in the kindergarten.
Teachers supervise children's daily life in the kindergarten. Teachers will not only provide classes for children to learn the basic knowledge of the world but also put together activities for children to participate as part of their early education development. Teachers have to commute on weekdays.
Campus nurse will take care of the well-being, as well as provide first aid to children registered in the kindergarten.

Worker:

Workers in the kindergarten will be in charge of the food service, maintenance and security. Kindergarten workers will consist of kitchen crew, maintenance supporter, and security guards.

Visitor:

Occasionally there will be visitors in the kindergarten. They could be scholars or any parties that got approved by administration.

MAJOR PROJECT ELEMENTS

For children:

Classroom
Classroom is the major indoor space that provides place for children to learn.

Napping room
Napping room is the place for children to take naps after their lunch. It is a required space according to *Chinese Kindergarten Design Guideline*.

Center courtyard
The Center courtyard ensures the daily activities children could have within their stay at kindergarten.

Outdoor playground
Outdoor playground involves kids with various open-air activities.

Clinic
Clinic should be equipment with basic medical machinery and supplied with necessary pharmacy.

For Faculty:

Teacher offices
Teachers' offices provide setting, storage space to fulfill the daily duty of teachers. It also gives teachers a rest space between class breaks.

Principle office
Principle office will belong to the school principle. It will also function as a small meeting room for occasional victors.

For workers:

Kitchen
Kitchen crew will be using this space to prepare meals served in kindergarten.

Shared Use:

Staff Cafeteria
Staff Cafeteria is the place for faculty and works to have their meals.

SITE INFORMATION

figure 01
Street Shot of City Hangzhou

Region:

The site is located at the Hangzhou, Zhejiang Province. It sits on the center part of China's east coast line. It is among the most developed region within the country. With the success of economic growth, culture and education system are gradually evolving within the region.

City:

City of Hangzhou is nationally known for its beautiful scenery and legendary history. Hangzhou was once the capital of China during the Song Dynasty (1127 – 1276 AD) and since then, it has become a regional center of culture and economic growth. It is believed that city of Hangzhou in China is the most Leisure City among the others. West Lake, located in the heart of the city, has always been the largest tourist attraction in Hangzhou. In recent years, a considerable amount of new citizens has settled down and started a new family in Hangzhou. According to the latest government report, Hangzhou has provided 240,360 new jobs for the new residents in 2012 alone. (Hangzhou Statistics Department, 2013)

Site:

The city has shifted its center progressively towards the northeast side where the

Qianjiang River located. The newly planed district Binjiang, known as the dreamland for new immigrants from other cities, has been expanding drastically in population. New families are facing with the problem of lacking available education resource.

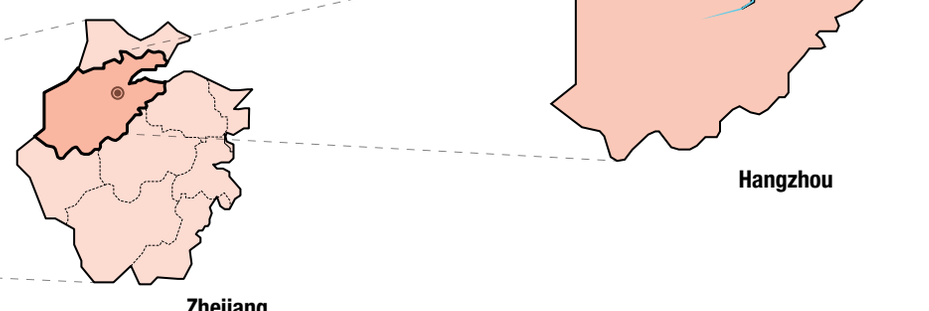


figure 02

Macro Information

The city of Hangzhou lies on the east coast of China. Project site sits on the south side of Qiantang Rive.

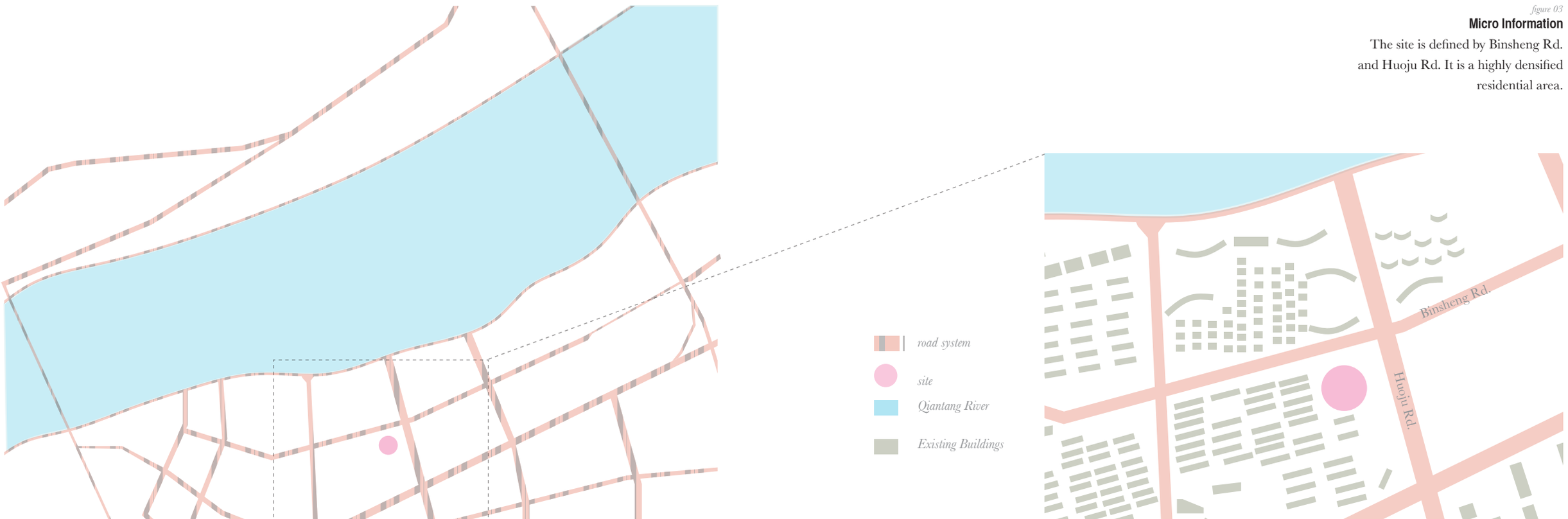


figure 03

Micro Information

The site is defined by Binsheng Rd. and Huoju Rd. It is a highly densified residential area.

PROJECT EMPHASIS

Research for the project will be conducted throughout the entire process. Further research will target at understanding the learning environment for young children in China, as well as the importance of active school programming. Case studies that cover the topic of kindergarten and playground design will be presented as precedents. Thorough analysis on the chosen site and its urban context will be included for design purpose.

A PLAN FOR PROCEEDING

Research Direction:

Research for the project will be conducted throughout the entire process. Further research will target at the importance for active kindergarten programming as well as the understanding of how architectural element would affect children's learning environment. Case studies that exhibited the integrated designs of modern kindergarten, specifically on indoor and outdoor activity playgrounds, will be presented as precedents. Thorough analysis on the chosen site and its urban context will be included for design purpose.

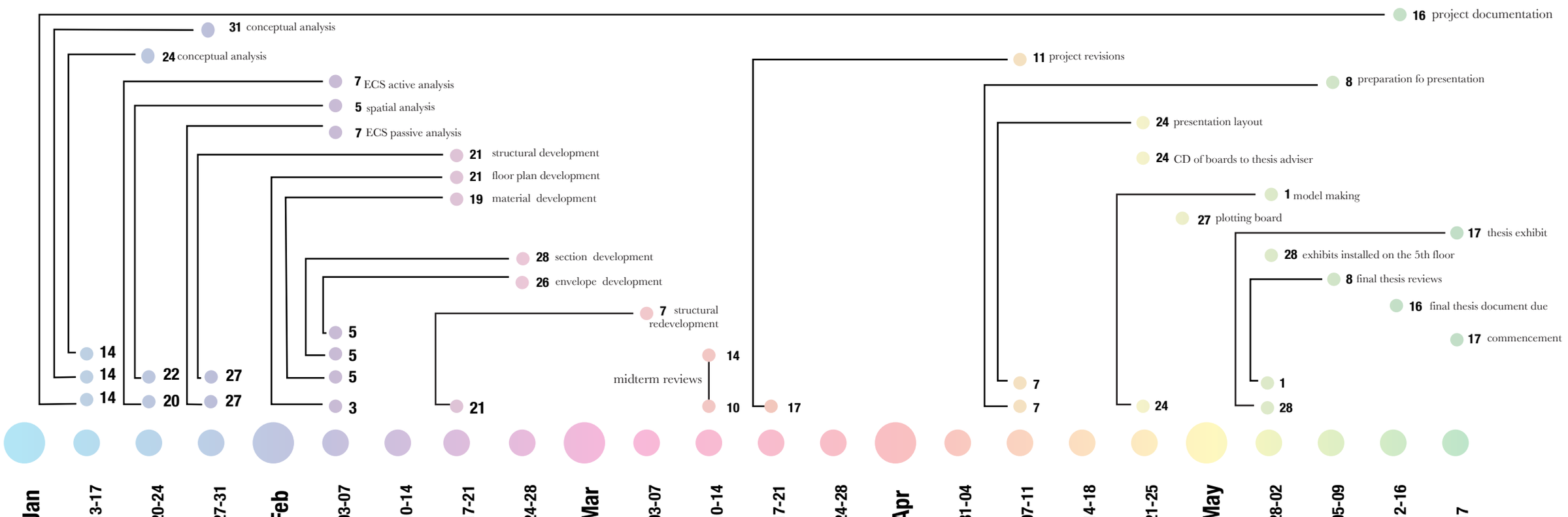
Design Methodology:

I will apply the mixed method, which engage with quantitative and qualitative analysis, graphic analysis and digital analysis to my thesis research. The design approach will follow the concurrent transformative strategy. During the research analyzing, interpreting and reporting of data will occur throughout all phases. The result will be presented in both text and graphics. Quantitative data, including statistical data that will be collected and studied locally, as well as scientific data, which will be obtained through instrumentation and experiment, will be presented along with the qualitative data that will be gathered by direct observation and archival search.

Documentation of Design:

Research and design process will be documented in a digital format. Research information from the network as well as the scanned material from books or magazines will be stored and cited directly onto the computer. Design process will be organized in a weekly order. Each week, a PDF file that reports the design progress will be created for reviewing.

DESIGN SCHEDULE



PREVIOUS STUDIO EXPERIENCE

Second Year

2010 Fall | Instructor Joan Vorderbruggen
Japanese Teahouse
Minnesota Rowing Club Boathouse

2011 Spring | Instructor Cindy Urness
Montessori School
Bird House
Dwelling

Third Year

2011 Fall | Instructor Regin Schwaen
Zombie Safe House
Snow Symposium
Artist In Residence

2012 Spring | Instructor Mike Christenson
NDSU Multi-use Technology Building

Fourth Year

2012 Fall | Instructor Don C. Faulkner
High - Rise
DLR Design Competition

2013 Spring | Instructor Don C. Faulkner
Ghana Campus Design
Marvins Window Competition
Downtown Campus Chalkboard

Fifth Year

2013 Fall | Instructor Mike Christenson
Digital Fabrication

THE PROGRAM

Challenges Ahead

An active school program is crucial for early childhood development. The challenges for contemporary early childhood development have been discussed over the decades. Many parents in China have been blaming the rigid education system that restrained children's brain development. The task appears to be more difficult than a sole education burden. As growing economics have activated a chain reaction on the land of China, the living environment does not seem promising for the young children.

According to David W. Orr, in his book *The Nature of Design* he summarized that the reigning political economy has shifted the lives and prospects of children from:

"

1.Direct contact with nature to an increasingly abstract and symbolic nature
2.Routine and daily contact with animals to contact with man-made things
3.Immersion in community to isolated individualism
4.Less violence to more (much of it vicarious)
5.Direct exposure to reality to abstraction/ virtual reality
6.Relatively slow to fast

"

Knowing the problems will help us to solve the issue with a clear direction. The focus of early childhood development education, to be more specific, kindergarten education in this case, should be laying on top these concerns.

Natural environment

The first issue brought to our attention is the problem of pollution. Many studies have pointed out the consequences of the rapid economic growing. As the biggest concern in China at this moment, pollution has becoming a nightmare haunting every Chinese citizen. In the book, *Urbanization, Energy, and Air Pollution in China: the Challenges Ahead*, the authors argued that most large cities and medium-larger-sized cities are polluted. Even scarier, many of the metropolises cities, for example Beijing, are among the most polluted cities in the world (Chinese Academy of Engineering, 2004).

The problem of pollution is not only hurting the environment but also gradually influencing people's life styles. In some severe cases, people are told to stay indoors more than outdoors in the urban area (Watt, 2013). Young children are living in an age that many actives are trapped in door. As most indoor actives tend to be sedentary, which is not the best for physical development for children at young age, indoor playground for young

children should be designed and developed in order to enhance their physical strength.

Obesity problem

Child obesity has become a growing concern for the major urban areas in China. National surveys have showed that children from urban area tend to have an animal-food based diet more than a vegetable and fruit based one. In addition, the increasing fast-food industry in big cities also contributed to this problem. It has been reported that more than 20% of school children in big cities consume fast food frequently and that 62.3% of them are not aware of the fact that this it is energy-dense food. The physical activity pattern for kids from urban area leads to the same result. *Zhongguo Xuexiao Weisheng* reported that urban children spend more time on sedentary activities than children from the rural area. Compared to the children from rural area, children from urban area spend more time in cars and sitting at home (Chen, T., Modin, B., Ji, C., & Hjern, A, 2011).

With the date collected in these scientific studies, it is not hard for us to picture a typical child's day in an urban area: dropped at kindergarten by parents in the morning, sit around during the stay at kindergarten, picked up by parents again in the end of the day then watch TV or play some video games until bed time. From day to day, there is not a lot activities involved in their life. The unhealthy lifestyle would have a potential to be carried on in their future life, in that case, the future generations in China will face a more dangerous problem. Throughout the kindergarten education, a relatively more active school program would help children acquire more exercise during their stay at the kindergarten. Additional designed indoor and outdoor playgrounds would effectively associated children with more dynamic activities rather than sedentary movements.

Communication

With the government control of population, most urban families could only have one child according to the national policy. The problem of a single-child family has been discovery in recent decades. With no other siblings, children showed a tendency to be more selfish and rude when they grew up (Evans, 2005). "Individualism" seems to be a growing apprehension in the young families. This very factor also influences the potential personality of a child in the future. A study has showed that boys raised as a single child tend to appear more "shy" and "introverted" at their young age, while boys raised in non-single-child family have a better score in these test behaviors (Tseng, Tao, Hsu, Qiu, Li &

GOEBERT, 2000).

A more cooperative school program is aimed at teaching children how to work and live with the community at their young age. The given environment (single-child policy) has limited the majority of families to offer certain important lessons in their life. With the opportunities that kindergartens could provide, children would learn to develop a full range of skills that will benefit their future at preliminary ages.

Location

In many European countries, the notion of "child-friendly city" has been drawing more and more attention during the past decades. The goal of this new proposal is to construct cities with more concerns for children. Ideally, a child-friendly city should provide more secured public space, and reduce the potential threat from criminal individuals and traffic. These ideas could be reviewed as " children valued as customers and citizens …and listened to with respect…and where every pubic space should be designed to take account of children's needs as well as adults" (Dudek, 1996). Recent years, it has become an inevitable trend for parents to send their child to a kindergarten where it is close to their workplace. However, the best scenario for kindergarten location would be at a walking distance from their home community.

The idea of "child-friendly city" might be a little advance at this moment, yet with the awareness of a more secured community; it is likely to construct the neighborhood into a child-friendly zone. Early childhood education is not a simple problem for educators, but an intergrade social development that relies on the effort from the whole community.

Active school programing:

Active school programming involves more physical activities for young children to participate while they are in school. Modern kindergarten designs should provide space for activities that promote children's early development through their own learning experience (Dudek, 1996). According to the study, Physical Activity During School Recess: A Systematic Review, the authors have pointed out that "physical activity is positively associated with psychological well-being, bone health, and motor skill development and negatively associated with waist circumference and clustering of cardiovascular disease risk factors" (Ridgers, Salmon, Parrish, Stanley & Okely, 2012). Various activities designed for kindergarten

educations will not only help young children to acquire basic living skills but also increase their physical well-being.

High/Scope

High/Scope curriculum for kindergarten education was first developed in the United States. The concept of this particular kindergarten curriculum is based on the theory that "children learn best form activities which the plan and carry out themselves". High/Scope outlines a set of 'key experience', which includes "using language, representing experiences and ideas; developing logical reasoning and understanding time and space".

The intention of High/Scope system is to encourage children to discovery their own way to occupy their staying at kindergarten. It gives children the maximum amount of freedom for their own activities. One extremely case study was observed that a little boy who simple lying on his backing beneath a table as his own activity of the day. This action went on for days, yet the teacher respected his behavior and presented a perfect reasoning that " if you see children as individual personalities from an early stage and give them to play on their own and as they like, they will find their own natural way to behave within the kindergarten society. Socialism has broken down and society is more individual – we must reflect this in the kindergarten. If you respect the children and believe that they are inherently social, but individual, you will create balanced secure individuals capable of growing within a modern society" (Dudek, 1996).

The dynamic method is heavily associated with activity space within the kindergarten. One main impression of a High/Scope kindergarten is the freedom of the space. In each classroom, the larger space is divided into several smaller segments. Those sections include art and craft area, sand and water area, reading area and so on. The spatial structural seems to be less rigid than a normal kindergarten arrangement. With the initial purpose, all materials and equipment within the building are made available for children's reach. In many classrooms, outdoor playgrounds are connected adjacently, so that children could extend their daily activities to the open-air environment with teacher's supervising.

Montessori Method

Maria Montessori invented the famous Montessori method for early childhood

education at the beginning 20th century. Her method with the mentally challenged children was so outstanding that she was able to teach some of her "slow" children to comprehend the standard reading and writing skills. With the faith that her routine would be ever more efficient with the normal kids, she later on applied this principle to the very young children who believed to have the same mental stage with the older restarted children

The sense of touch was a fundamental factor in this approach to early childhood education, Montessori believed that if not established during the preliminary period of child's life, sensitivity acquired in a later time in life might be lost. Based on this theory, she organized three crucial types of activities for Montessori kindergarten: "the exercise of practical life; the exercises of sensory training, and the didactic exercises" (Dudek, 1996).

The freedom provided by Montessori school created opportunities for pupils to learn from each other. By observing a successful performance of a simple task, young children would acquire the same action later in kindergarten. "At times they followed one another like a flock of lambs; when one child took up an object, all the others wanted to imitate him, sometimes they rolled on the floor and overturned the chairs." confessed a parent whose child participated with this learning methodology (Montessori, 2008).

Montessori kindergartens are usually designed with large "empty space". There is no flexed furniture in classrooms, all equipment are designed with the height and scale of a child. Tables and chairs are carefully made with light-weighted materials so that children would be able to move and arrange these items themselves. Many interesting designs of school equipment were created for this particular purpose. In recently development, Montessori method has been spread over the globe. This environmental-oriented, humanistic, and rational teaching philosophy remains universally appealing.

Summary:

In order to discuss the importance of active school programing for kindergarten education in China, this thesis research is primarily dedicated to two set goals: First, to acquire a deep understanding of the current learning environment for young children at their preliminary ages, especially challenges ahead in the future. Second, to grasp a profound knowledge of kindergarten curriculums that heavily associated with active programming.

The modern society has gradually reformed the lifestyle of young children. Unfortunately, this new shift seemed to have no positive feedbacks on children's physical development. With the large possession rate of private cars, new technologies and highly industrialized urban context have made the mass public avoid the minimum amount of daily physical activities. Children in China today, are living in an environment in which no blue sky could be seen. Poor air quality, which would cause potential disease, is inevitable with current rapid pace of city expansion. Research also showed that the prolonged traveling time by cars and the growing fast-food consumption have been contributing to the increasing rate for child obesity in China. More physical activities should be designed into children's education in general. In this case, kindergarten curriculums in China could have required the active participation of daily exercises.
As a social phenomenon resulted from the single-child policy, younger generation in China exposes a tendency to be extremely selfish. A more cooperated social environment should be established during the early ages for children. Kindergarten education should provide the sense of collaboration as the first lesson for children to join the community.

Activities are an essential part for modern kindergarten education. The definition of "activity" could be interpreted in two different perspectives for this thesis project: first, the literally physical exercise; second, daily routines based on the specific teaching approach. The first explanation stands for itself that physical activities should be promoted during children's kindergarten experience, while the daily routines for kindergartens should be discussed separately. The main research looked two major active early childhood education approaches, High/Scope and Montessori method. They both appear to be very flexible and rational in instructing the young kids. However the freedoms that provided by these two philosophies are very different. High/Scope expresses the freedom in a sense of independency. It is up to the child to decided what kind of activities he or she would participate everyday. On the other hand,

Montessori school applies the freedom as a way for children to learn from each other, being enlightened through observations. It is important to understand the core ideology before the physical design of an educational facility. Architecture space should be highly associated with its leading philosophy so that it could be serve as part of the teaching procedure.

CASE STUDY RESULTS

Introduction:

The following three case studies were selected to enhance the understanding for theoretical premises and design for active programmed kindergarten. The list consists of Kindergarten Lotte in Tartu, Estonia, Timayui Kindergarten in Santa Marta, Colombia and Fagerborg Kindergarten in Oslo, Norway. Studying the existing projects could generate new ideas and inspire design methodology. Through researching into precedents of designed kindergarten, the investigation on how active school programming would influence early childhood development could find its supporting evidence and facts.

figure 04
Photo of Kindergarten Lotte
[http://www.archdaily.com/349378/kindergarten-lotte-kavakava-architects/]

KINDERGARTEN LOTTE

KAVAKAVA ARCHITECTS

TARTU, ESTONIA

Introduction:

Kindergarten Lotte designed by Kavakava Architects is a quality project that highly influenced by modern architecture philosophy. The building took approximately 1900 m^2 in gross building area and finished construction in 2008. Like many former Soviet Union courtiers, the city of Tartu, Estonia has set goals to promote the modern architecture in new city planning. Kindergarten Lotte, located in one of the most derelict area of the city was a success under this policy. This project emphasized the significance and elegance on basic geometries. It not only provided active architecture spaces for children to explore but also embedded with knowledge that would benefit them for the future.

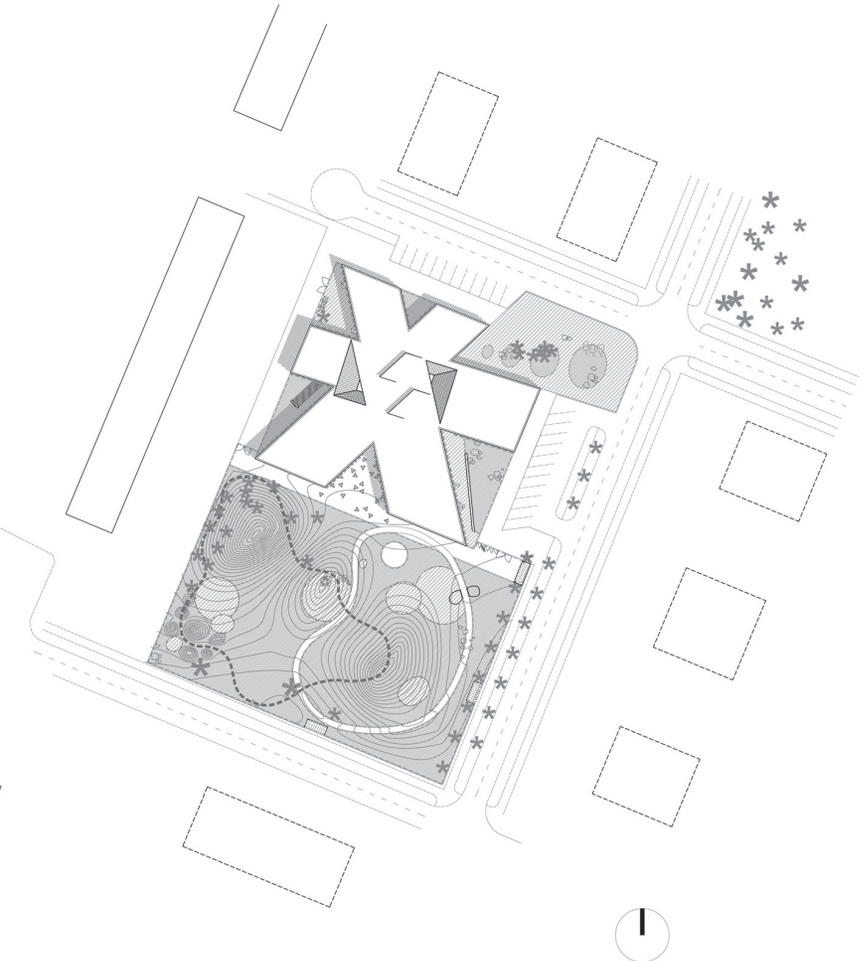


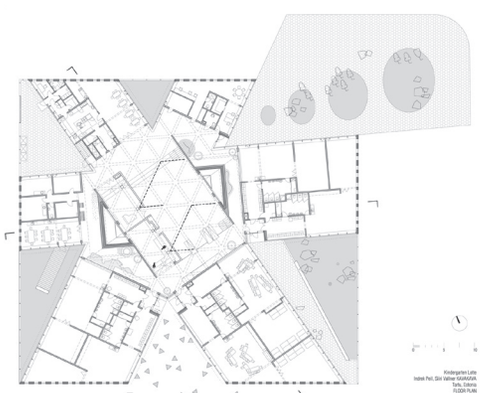
figure 05.1

Site Plan (above)

figure 05.2

Floor Plan(right)

[http://www.archdaily.com/349378/kindergarten-lotte-kavakava-architects/]



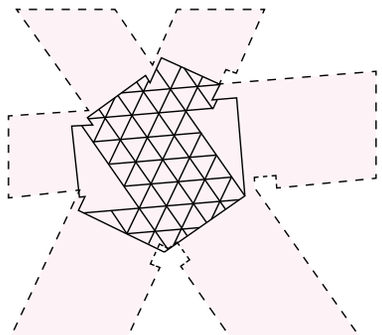


figure 05.3

Structural Analysis

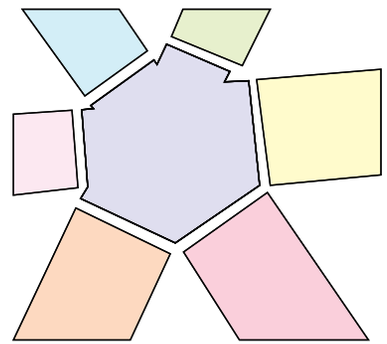


figure 05.4

Space Hierarchy Analysis

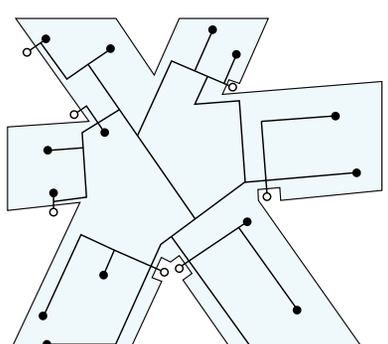


figure 05.5

Circulation Analysis

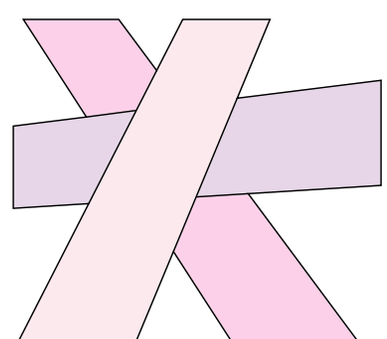


figure 05.6

Mass Analysis

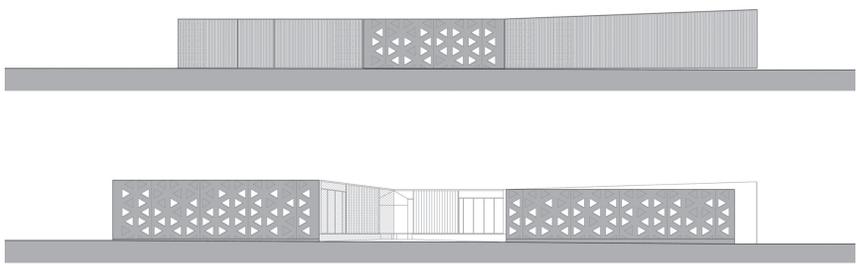


figure 06.1

Elevations

[http://www.archdaily.com/349378/kindergarten-lotte-kavakava-architects/

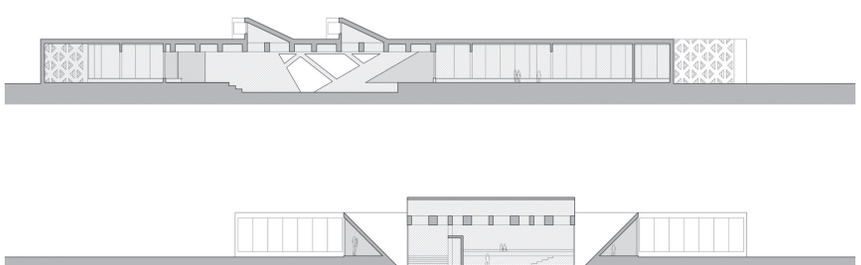


figure 06.2

Sections

[http://www.archdaily.com/349378/kindergarten-lotte-kavakava-architects/]

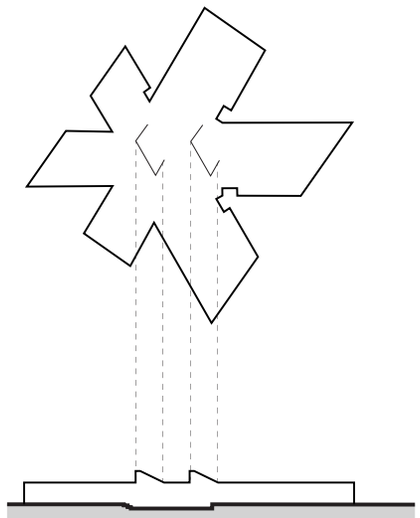


figure 06.3

Plan to Section Analysis

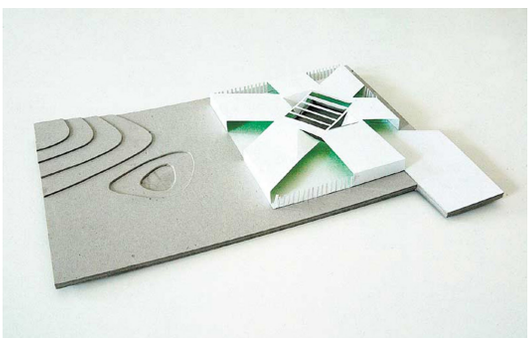


figure 06.4

Model of Kindergarten Lotte

[http://www.archdaily.com/349378/kindergarten-lotte-kavakava-architects/

figure 06.5

Day Light Analysis

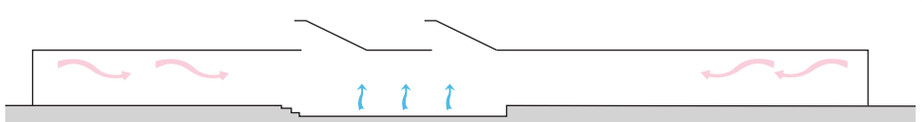


figure 06.6

Thermal Analysis

Research Findings:

Kindergarten Lotte is a typical design of European educational facilities for young kids. On contrasted with the surrounding environment, it delivered a sense of freshness and drawn people's attention to the site. This project used a balanced combination of material. The main construction was based on the cast-in-place, single-colored concrete. Yet with the playful window designs, the building appeared to carry a colorful and pleasant sensation rather than cold and boring impression, which normally brought by concrete material. The design team used a bamboo material to separate the kindergarten from the outside world. Bamboo fences were leveled with the height of exterior walls and aligned with the edge of interior corridors.

The main focus of the design was the various geometries that implanted in every design aspect of the building. The initial design of the kindergarten was a six-ended, star shape. By fitting this geometry into a rectangle square, it created several dynamic voids that functioning as outdoor playgrounds. This modern design also largely applied active environment control principles to the building. Large solid concrete walls, functioned as thermal mass, helped the building to generate heat and accelerate airflow within the indoor area; abundant window openings supplied the natural lighting during the day.

Conclusion:

Unlike the other case studies, the formation of this project was caused by architecture alone. With no further material to support the initial intention, Kindergarten Lotte lack a philosophy meaning for being an educational facility. It is not to argue that every existing building needs a meaning behind it. However, this thesis is an investigation to examine a solution for early childhood education. With programed purposes, spaces would function with an intention. Without reasoning, architecture appears to be meaningless. The design of the Kindergarten Lotte was quite a success, yet it could be pushed a litter farther so that the architecture of the kindergarten could somehow contribute to the education.

figure 07.1
Center Courtyard
[http://www.archdaily.com/349378/kindergarten-lotte-kavakava-architects/]

figure 07.2
Dinning Room
[http://www.archdaily.com/349378/kindergarten-lotte-kavakava-architects/]

figure 08.1
Photo of Timayui Kindergarten
[http://www.archdaily.com/201977/timayui-kindergarten-giancarlo-mazzanti/]

TIMAYUI KINDERGARTEN
GIANCARLO MAZZANTI
SANTA MARTA, COLOMBIA

Introduction:

The Bogata-based architecture studio Giancarlo Mazzanti has recently finished an educational facility for children between the ages of 0 to 5 years old. This flower-shaped kindergarten proposal located at Santa Marta, Colombia; it spread along the riverside of the city, establishing a small community for kids only. Timayui Kindergarten consisted of six individual units. Yet, with the connection of continuous outdoors corridors, this design was also a united liner space that blending all tasks together. Studio Giancarlo Mazzanti applied the three key elements of kindergarten education: children, teacher and parents into a literally interpretation. Each individual unit was constructed with three interrelated

space; the finished part was molded into a triangular shape jointed by an outdoor center courtyard. This fairly large design complex could serve up to 300 children on site.

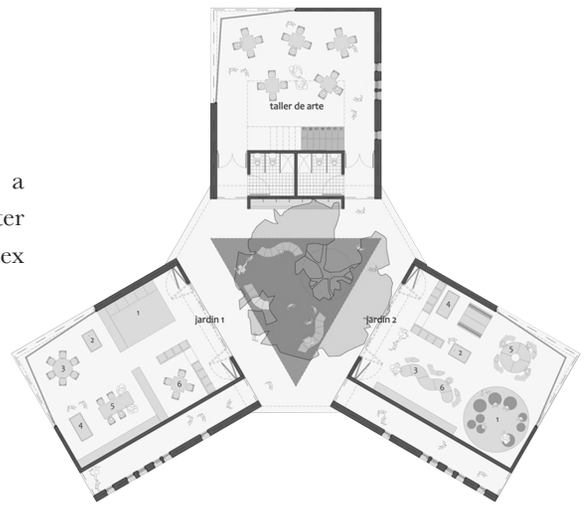


figure 9.1
Floor Plan

figure 9.2
Site Plan
[http://www.archdaily.com/201977/timayui-kindergarten-giancarlo-mazzanti/]

figure 9.3
Bird Eye View
[http://www.archdaily.com/201977/timayui-kindergarten-giancarlo-mazzanti/]

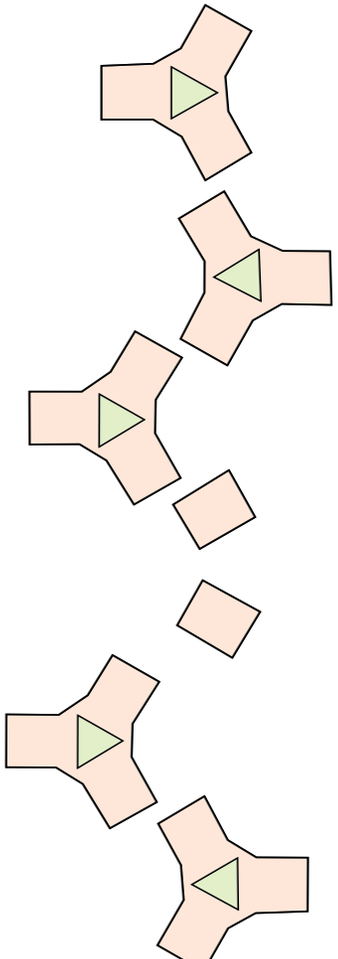


figure 9.4
Repetition Analysis

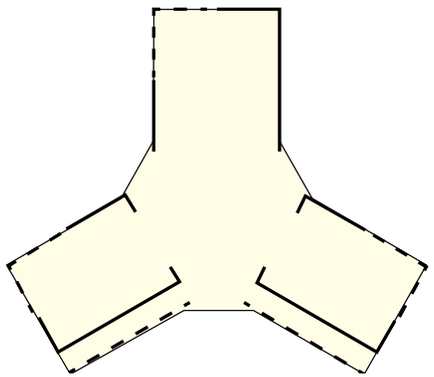


figure 10.1
Structural Diagram

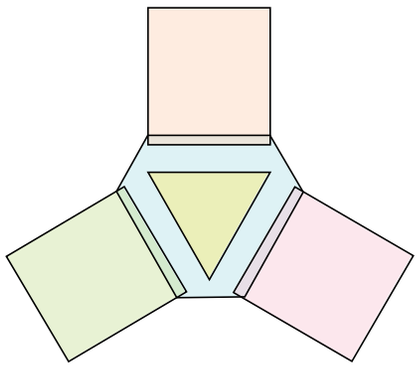


figure 10.2
Space Hierarchy Diagram

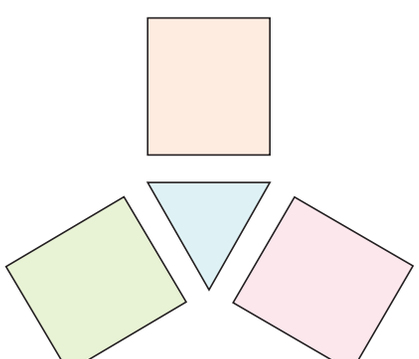


figure 10.3
Mass Diagram

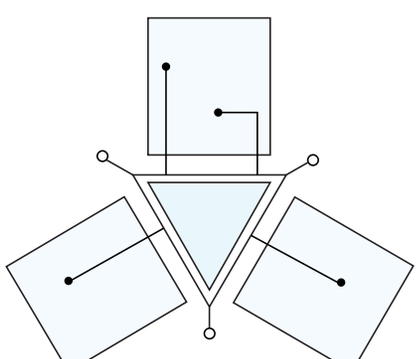


figure 10.4
Circulation Diagram

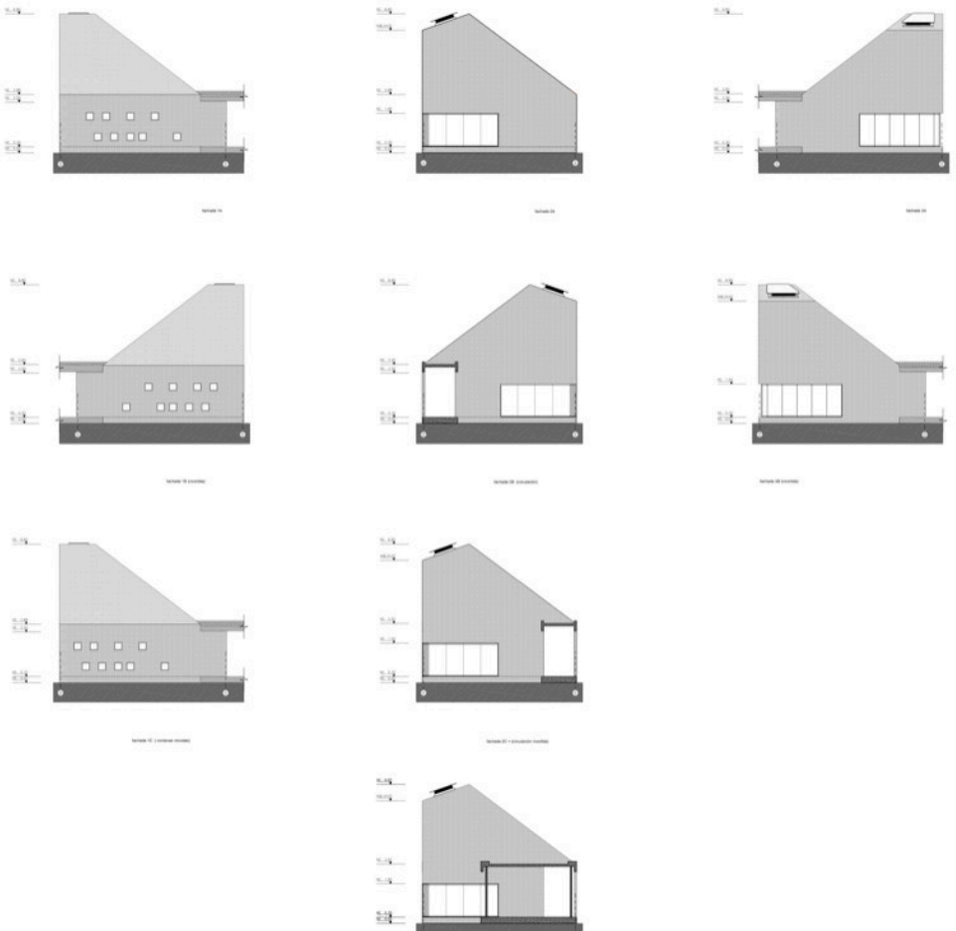
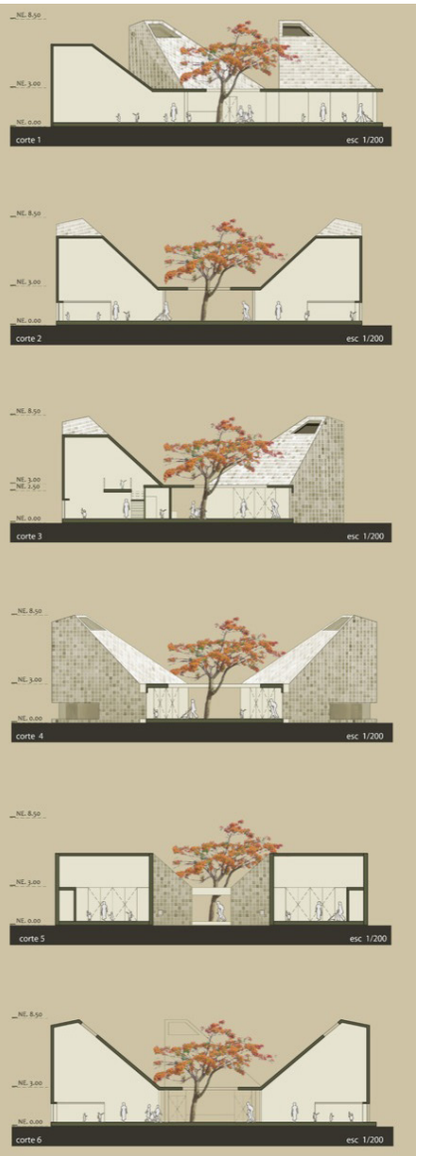


figure 10.5
Elevations
[http://www.archdaily.com/201977/timayui-kindergarten-giancarlo-mazzanti/]



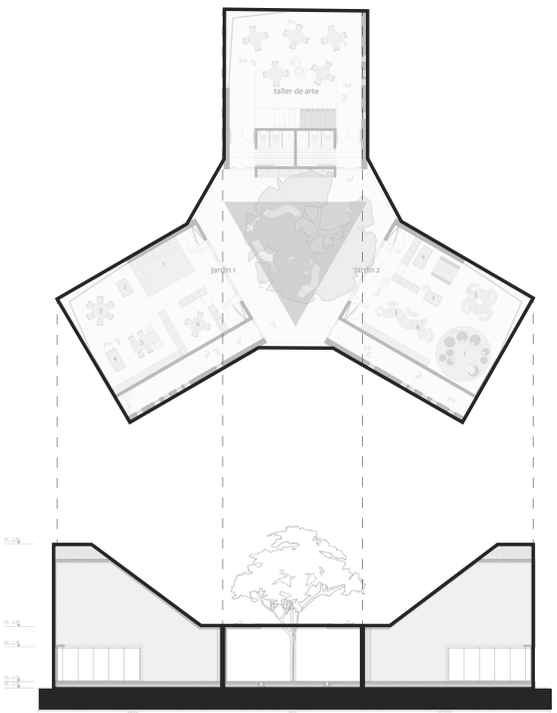


figure 11.1

Plan to Section

figure 11.2

Sections (left)

[http://www.archdaily.com/201977/timayui-kindergarten-giancarlo-mazzanti/]

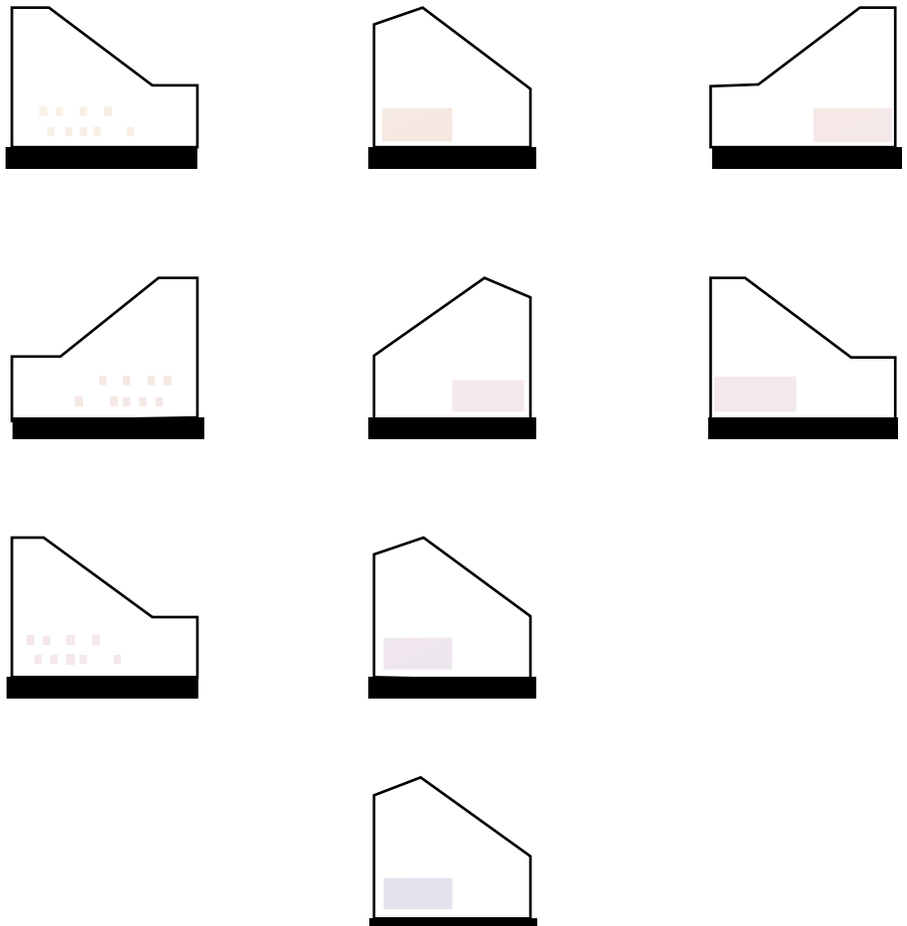


figure 11.3

Day Light Analysis

Research Findings:

Timayui kindergarten is based on a median-sized Caribbean coast city, Santa Marta in Colombia. Unlike the surrounding environment, this design addressed a new community planning for the neighborhood; it modified the traditional Colombia architecture with a modern twist. Like many local architecture, Timayui Kindergarten kept the notion of small scale, it applied additive principle to accomplish every desired space. Distinct with two other case studies shown in this section, this particular proposal appeared to be the most literally interpretation from its concept to construction. During the process, the design team emphasized the importance of three numerous times. First, the very afflatus of the project was the interrelation between children, parents and teacher. It is true that kindergarten education is largely based on the communication of these three groups of people. Next, by generating the idea of three, each individual unit of the school was designed with three separate spaces. Last, by connecting with a center courtyard, the final shape of the individual units was the sturdiest geometry- triangle. Timayui community was a relatively new development on the edge of city Santa Marta, many residence in this area were families that fleeing away from the violence. Timayui Kindergarten provided a shelter of peace for children growing in the new neighborhood. The loose, open-ended design of the project encouraged young kids to get involved more with the fresh air and outdoor activities.

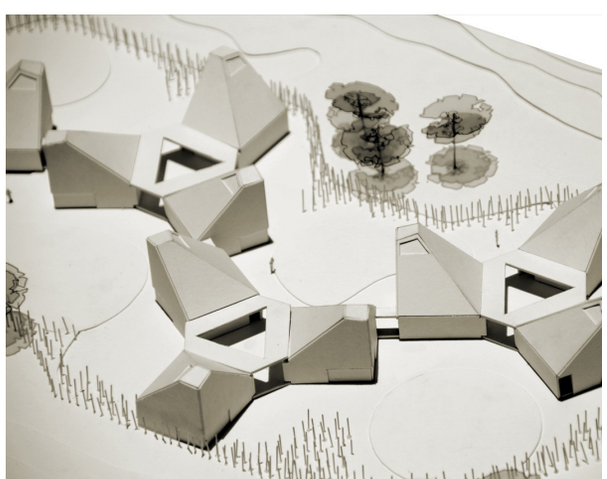


figure 12.1
Model of Timayui Kindergarten (left)
[http://www.archdaily.com/201977/timayui-kindergarten-giancarlo-mazzanti/]

Conclusion:

Timayui Kindergarten displayed a great example for this thesis project. It satisfied the cultural, social and political needs for the Timayui community in city of Santa Marta, as well as engaged with the future of the newly formed neighborhood. This case study supports the unifying ideas and theoretical premise for the thesis project. It opened up the classrooms so that children would discovery and learn more from the outdoor environment.

figure 13
Photo of Fagerborg Kindergarten
[http://www.archdaily.com/120498/fagerborg-kindergarden-reiulf-ramstad-architects-thomas-bjorvatlatennye-bilder/]

FAGERBORG KINDERGARDEN

REIULF RAMSTAD ARCHITECTS

OSLE, NORWARY

Introduction:

Fagerborg Kindergarten designed by Reiulf Ramstad Architects located at a small city park in center Oslo. This project features in 4 different units. Two of which are designed for children between the ages of 1 and 3, and two other units are spaces for kids age from 4 to 6. Surrounded by residential complexes construed from the early 20th century, this remarkable modern proposal was partially a request from its historical community. The goal of the program was to create a meaningful architecture framework so that it will encourage children to build their first steps away from the nursery of family. Fagerborg Kindergarten takes 1,200 m2 in area; and after 8 years of planning and constructing, it was finished in 2010.

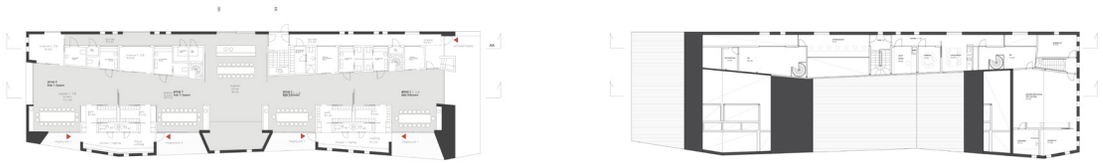


figure 14.1

Floor Plans

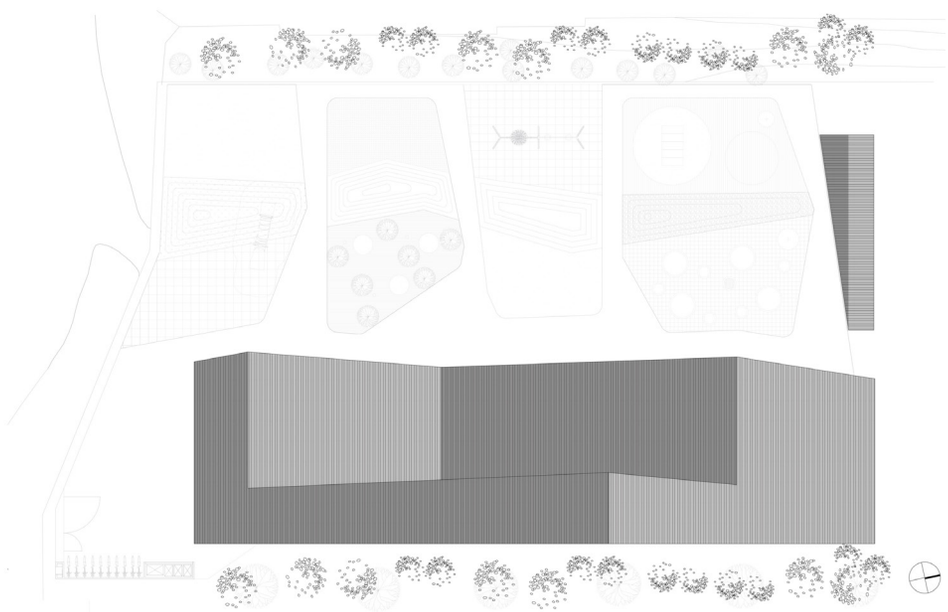


figure 14.2

Site Plan

[http://www.archdaily.com/120498/fagerborg-kindergarden-reiulf-ramstad-architects-thomas-bjørnflatenmye-bilder/]

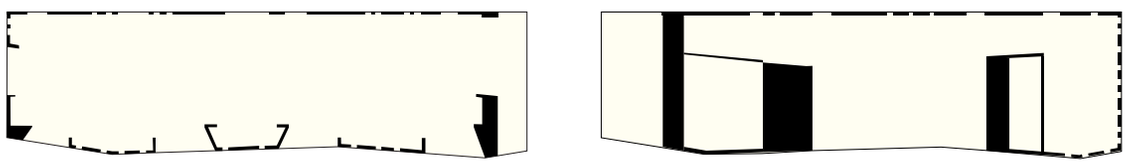


figure 14.3

Structural Analysis

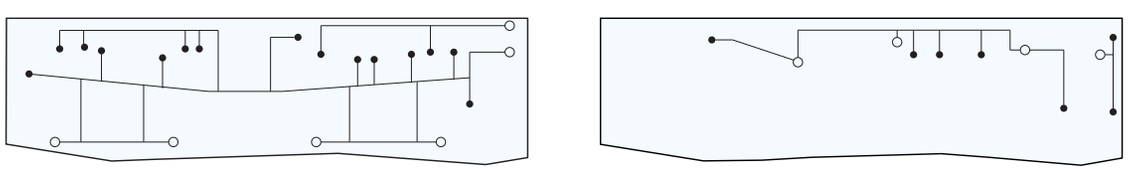


figure 14.4

Circulation Analysis

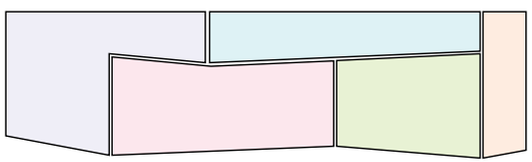


figure 15.1
Mass Analysis

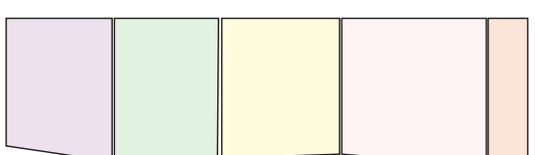
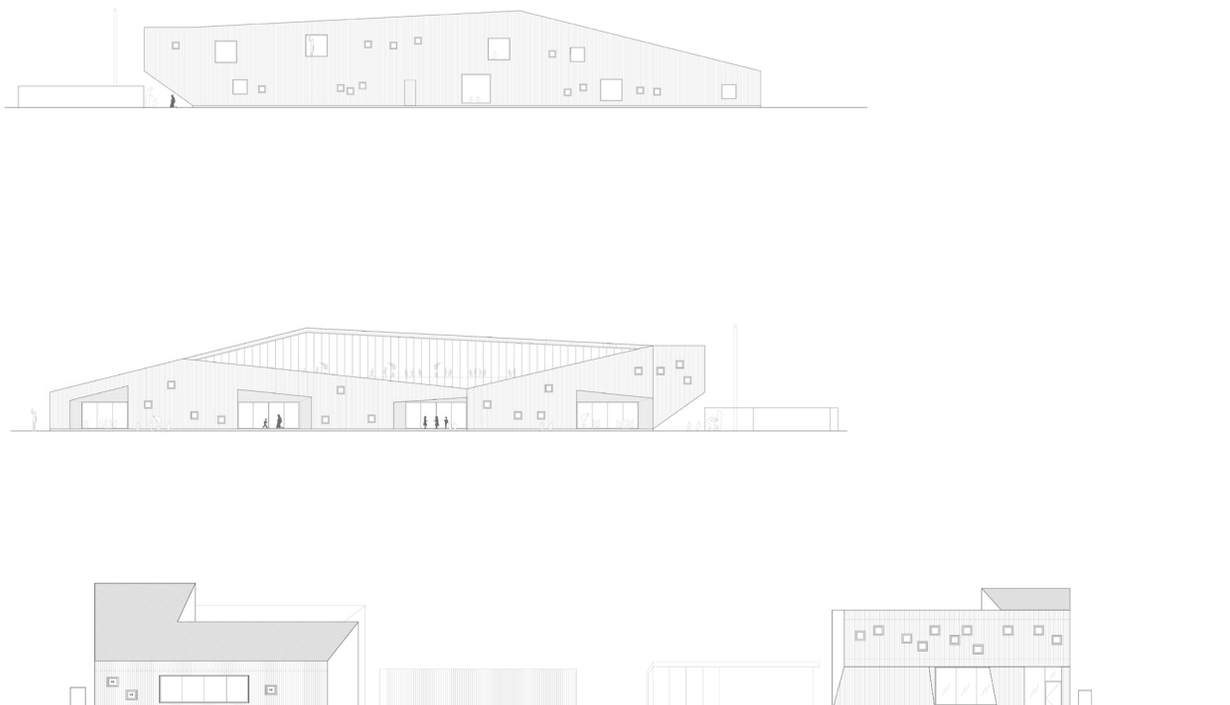


figure 15.2
Space Hierarchy Analysis

figure 15.3
Photo of Fagerborg Kindergarten
[http://www.archdaily.com/120498/fagerborg-kindergarden-reiulf-ramstad-architects-thomas-bjørnflatennye-bilder/]



Thale 16.1

Elevations

[http://www.archdaily.com/120498/fagerborg-kindergarden-reiulf-ramstad-architects-thomas-bjørnflatenmye-bilder/]

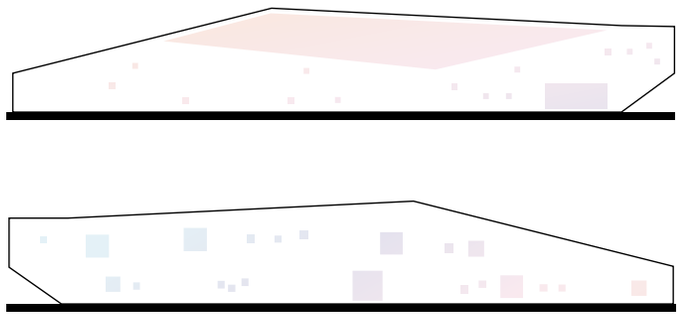


figure 16.2

Day Light Analysis

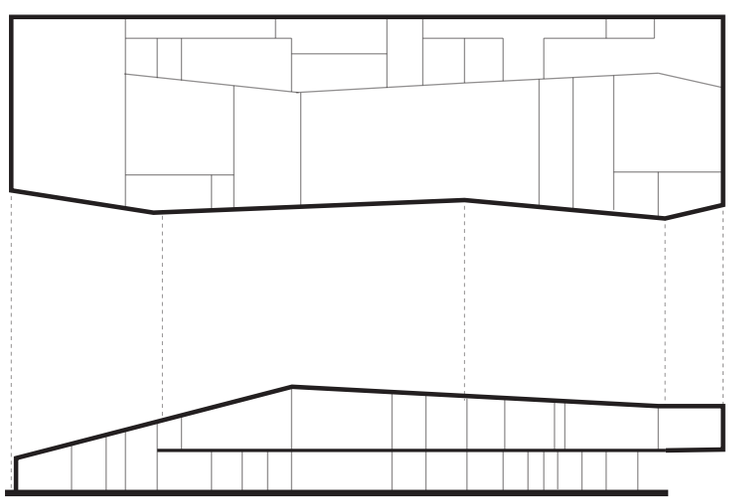


figure 16.3

Plan to Section

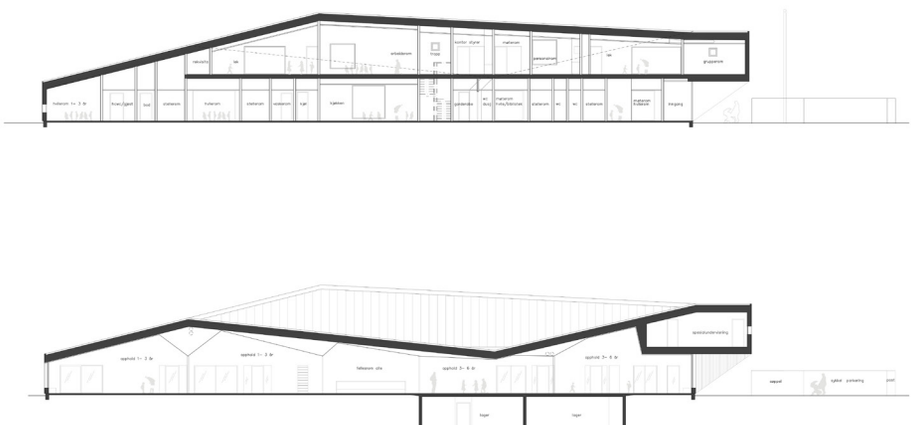


figure 17.1

Sections

[http://www.archdaily.com/120498/fagerborg-kindergarden-reiulf-ramstad-architects-thomas-bjørnflatennye-bilder/]

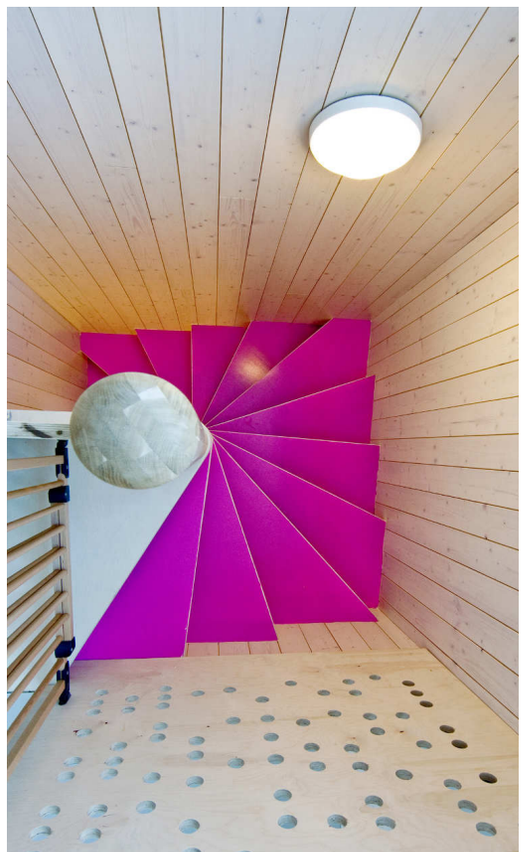


figure 17.2

Staircase 1

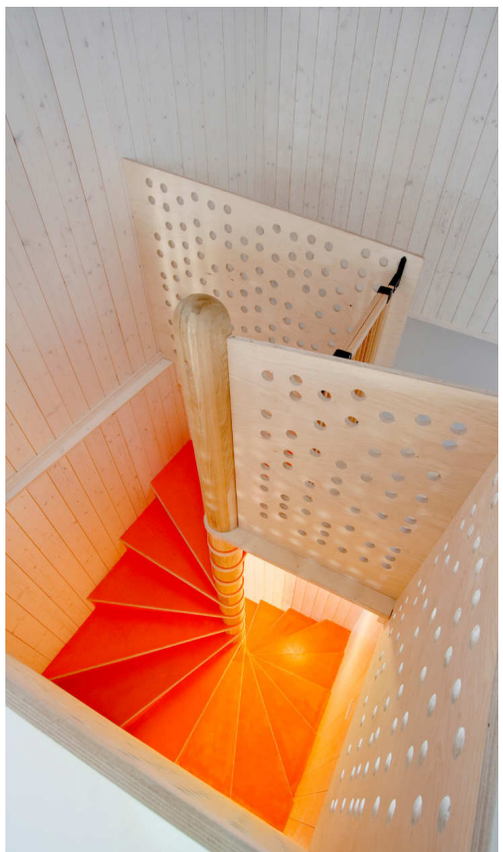


figure 17.3

Staircase 2

[http://www.archdaily.com/120498/fagerborg-kindergarden-reiulf-ramstad-architects-thomas-bjørnflatennye-bilder/]

Research Findings:

Fagerborg Kindergarten is the only project influenced by contemporary architecture among the neighborhood. This bold and geometric design has been drawing a large amount of attention onto the kindergarten itself. Designed by Reiulf Ramstad Architects, the objective of the program was very similar to my original proposal for the thesis project, to provide an thoughtful architecture space that would optimizes the formation and development of children at their young age. The designed space within the kindergarten allowed the four main units stay separately and function as individual division, yet they were connected with common community space and linked as a whole. This design helped to provide different class environment and teaching style; furthermore, it offered the children a house full of meaning full architecture characters for them to explore. This project primarily used wood as construction and decorating material. The exterior façade was wrapped with vertical wood stripes and a playful window opening design. It delivered a warm perception and ensured adequate natural lighting during the day. Like many other kindergarten designs, Fagerbory Kindergarten used majority light material so that it created a clean and fresh sensation. The interior design of the project was a balanced mixture of color and texture. It used several bright colors to highlight community space and furnished with patterns that made the space livelier.

Conclusion:

Although Fagerobry Kindergarten was an excellent design for modern kindergarten, it did not provide the answer to the agreed objective- would this rich architecture design influence the formation and development of children at their young ages? The program of the design included various room and spaces for children to explore at their first stage of life. However, the design of the architecture did not participate in any activity of the program. With all these quality spaces, we are still looking for a proof that shows the differences have been made by architecture alone. This case study ascertained the unifying idea of this thesis project that designed architecture should function as part of the school programing.

figure 18
Exterior Windows
[http://www.archdaily.com/120498/fagerborg-kindergarden-reiulf-ramstad-architects-thomas-bjørnflatennye-bilder/]

Summary:

These three case studies examined several different approaches for designing an educational facility for children. They appeared to be very distinct at a glance, yet through compression, they all share certain similarities.

First, the most palpable trait is the application of basic geometry. All three cases used fairly simple geometries as the building form. Fagerborg Kindergarten was shaped with three rectangular volumes while Kindergarten Lotte and Timayui Kindergarten used triangle as fundamental design units. The interior design of all three cases was also furnished with the geometric patterns and decorations. This application seemed to have a positive feedback on children's formation and intelligence development at their preliminary ages.

Second, they all emphasized on the importance of natural daylight, window openings and curtain walls become one of the key elements for these designs. Consider the operating time for a typical kindergarten; daylight is essential for this type of education. In each case, designers tended to use window openings not only as a way to access natural light, but also a playful design for children to explore.

Third, these case studies all highlighted the usage of the shared space: corridors, courtyards and playgrounds. Each case has developed the individual units to separate the functions attached to the space, yet they all underscored the common spaces that shared by every member within the building.

The biggest variation lies between these case studies was the portions for indoor and outdoor playgrounds. Kindergarten Lotte displayed a balanced portion of outdoor and indoor play area; Fagerborg Kindergarten showed the minimum amount of outdoor playground yet the most developed indoor activity area; Timayui Kindergarten was designed with the least amount of indoor play area among the three, but at the same time, possessed the broadest outdoor space. Although Kindergarten Lotte shows the minimum philosophy meaning behind the design, it provided a balanced design space that allows children to engage any types of activities. This design approach will be carried on during my thesis design phase. It encourages me to enhance my theoretical premises on active school programming, as well as the associated architecture space and to discovery the precise portion for indoor and outdoor playgrounds.

Introduction:

As the most common form of early childhood education, kindergarten experience could be related to the majority of the populace on earth. It is critical for this thesis project to research into the history of how kindergarten has gradually become the authority facility for early childhood education. Furthermore, it is equally important to understand the development of modern kindergarten architecture. With the information of general history on this subject, this thesis project also requires to investigate into the local history of Chinese kindergarten education. Only through general to specific, one could seize the knowledge for the redesign of a prototype kindergarten.

The Formation of Kindergarten

The origin of early childhood education has been reasoned to the present time. It is ambiguous to determine which philosophy was the most substantial principle that funded this field of study. Regardless of all the different thoughts, the concept of kindergarten was first generated in the 17th century. At that time, Comenius, first came up with the idea of organized childcare. He suggested that the objective of this new faculty was to "training of the senses and the mastery of elementary facts and words". Later on, this became the type of things being taught in nursery school or kindergarten (Cole, 1965).

The term "kindergarten" originally derived from the concept that children, like unfolding plants, should be nurtured in a warm garden during the cold winter. It is a metaphorical garden for kids to grow safely and happily. During the early 19th century, Scottish educators proposed the notion of encouraging young kids to participate more play activities during their stay at the nursing schools. They invented the term, and believed that kindergarten should become a microcosm world for children (Dudek, 1996).

In 1928, Margaret McMillan named her nursery school 'garden city of children', Penn Helen quoted her idea on childhood education in the article 'Nursery education: what should it look like?'

"The school of tomorrow will be garden city of children; that is to say a place of many shelters – a township, if you will of small schools built as one community but with every shelter organized as a separate unit designed to meet the needs of children of specific age or stage of life...Every shelter is in effect a small school. It is also a self-contained unit or school home; it has its won Head; it has also won bathroom, its own equipment, and its own school day, adapted to the needs of children at specific stage of development"

(Helen, 1994)
This is no clear boundary between the term nursery school and kindergarten. In general, regardless of the regions and countries, kindergarten usually stands for the first institution for systematic education while nursery school function more like a child day care center.

Kindergarten Architecture

As a discrete branch of the modern architecture movement, kindergarten designs were constantly influenced by the dominated discourses and design philosophies at each time. The development of kindergarten architecture is not liner progression in history, it swung back and forth during the early 20th century.

Croatia designer Rolf Steiner advocated a spiritual movement built upon the concept that high intelligence and comprehensive sensation could be accessed through organic, expressive architecture. Certainly, this extremely experimental theory operated against the mainstream educational authorities locally. In the early 30's, the newly nominated head of architecture at Bauhaus approved a more scientific method. This rational methodology was essentially the universal design formula 'Function× Economy = Building' (Dudek, 1996). Eventually, the switched new policy stopped the spreading of Steiner's ideology on the land of Europe at that time. Steiner theory went backward with the movement of modern architecture; yet, his influence on organic, expressional architecture has inspired many fellow contemporary architects to apply his unique reasoning in kindergarten design.

The continuous modern European architectural movement triggered two major new developments before the World War II. The conventional discourse at that time was the philosophy of "Machine Aesthetic". Under this influence, the first significant shift was the application of new materials and innovative technology. This included the fabrication skills invented during the 20's. For example, Mass production technique allowed the construction process to be faster and more efficient. Benefited from these technologies, many modern kindergartens were being built at that time. The second new breakthrough was the emphasis on pragmatic design. Kindergarten design became an intergrade development that consisting of various individual units for functions. This fresh trend accelerated the breakdown of design elements. More outdoor playground and activity units were being utilized during the design process. It inspired architects like

Le Corbusier to propose an epic rooftop as a designed kindergarten, which certainly educated the public on the importance of early child development (Dudek, 1996).

Throughout modern architecture history, it is hardly to find an agreed building type as the prototype kindergarten architecture. As the nature of this educational facility, kindergarten design should be heavily dependent on its programmatic planning. The history of kindergarten architecture surely provided the critical thinking for designing the creative kindergarten in the future.

Kindergarten development in China

The appearance of kindergarten in China began at the end of last century. Backs then, a numerous church- run kindergartens were funded at coastal cities, based on foreign disciplines. The initial Chinese kindergarten did not begin until 1904. The central government of Qing Dynasty organized a government-oriented young children educational facility Mengyanyuan, in the city of Wuhan by Yangtze River. However, this particular institute was adopted with a Japanese curriculum. With the heavy shade of colonization, the trial of Mengyanyuan hardly had any positive contributes to modern early childhood development in China (Chen, 1996).

It was not until the early 1930's that China finally had the first breakthrough for kindergarten education. During that time, many pioneer scholars and educators graduated from major universities in the United States retrieved back to their homeland, they started to aggressively promoting the education system from the western world including kindergarten education. "Kindergarten practices were improved by relating the ideas to Chinese conditions and using Chinese toys and Chinese stories, and mothers were given training in child-rearing" (Cleverley, 1991). Those educators altered the western modern kindergarten education into a more Chinese based ideology. This movement influenced generations of fellow Chinese educators; it also pushed the Chinese society in pursing the kindergarten model from Soviet Union during the 1980's (Hsueh, Tobin & Karasawa, 2004).

Newly issued Kindergarten education guidelines in 2001, underscored that early childhood education would effect children's learning experience in long-term. The new Guideline demanded all teachers to respect every child as an individual and required kindergarten education to be integrated

with the social and culture environment. As quoted from the member of committee who published this new guideline, "Teachers daily interactions with children are meant to enhance the shared learning and simultaneous growth of both teachers as professionals and children as society members" (Wang, 2002)

Compare to countries like the United States and Japan, Chinese kindergarten education is still at its adolescence stage. It grows the faster more than ever, yet very unevenly distributed from a geographical point of view. It discoveries new findings and possibilities constantly, but also unpredictable for what will happen in the future (Hsueh, Tobin & Karasawa, 2004).

THESIS GOAL

Academic

This thesis design is created for completing a master of architecture degree at North Dakota State University. By proposal this project, the thesis will not only serve as a future reference and a detailed case study for architecture student, but also an integrated study of architecture and education. In both cases, the primary goal is to provide a precedent of active programed educational facility for children at their preliminary ages. The concepts and solutions revealed in this thesis will contribute to the understanding of the relationship of active school programming and the associated architecture spaces. The finished thesis will provide some answers to future investigators who share the same passion in early childhood development.

Professional

The professional goal of this thesis project is to set an archetype of designed kindergarten in Chinese society. It meant to be an original design that resolving the dilemma between family and community. The researches presented within the thesis should invoke critical thinking for planers in China so that professional architects would deliberate like educators while undertaking a similar design. This thesis also examines an aggressive theory that challenges the limits for architecture. It addresses the question that in which way could architecture participate the learning progress of kids at their young ages.
Can architecture become part of the education for young children? This thesis project offers several solutions that will benefit the profession in the future.

Personal

Finishing the thesis project is a personal milestone on my journey to be a professional architect. It indicates that I as an architecture graduate have the ability to undertake comprehensive design challenges independently. It might be the end chapter for me as a student, but it is certainly the beginning of a career pursing architecture. The project is purely driven by my passion and ambition. Compare to the satisfaction of fulfilling personal goals, all these unceasing effort seem to be worthy by the end of the day. In the future, I wish I could stay as passionate as my current state. Always evoke the memory of this valuable experience and appreciated the hard works I am about to receive from the real world.

Qualitative Aspects:

Narrative:

Driving on the Fuxing Bridge, known as the number 4 bridge across the Qiantang River, I gradually saw the rising horizon of the new city skyline. It was a typical weekend for me to pick up my cousin who lived in one of the apartment complex on Huoju Rd., Binjiang District. Located at the south share of the Qiantang River, Binjiang District in Hangzhou is geographically isolated from other major districts. Before, this recently planned district mostly acts as the higher education college zone as well as the industrial center, in addition to the older city functions. Due to these specific occupations, residents who live across the river would not have many reasons to visit this part of the city. As a member of the "north bank" resident, I personally did not have any objectives to come here besides to pick up my cousin.

Today, when I drove down the streets, I could not believe all these high-rise residential buildings are completed within 10 years. Not too long ago, my image of this area was still a land of emptiness, only certain portion of the district was development. Like many metropolises city in China, the city of Hangzhou has been enlarging its boundary since the beginning of 1990's. The rapid growth of Binjiang District was resulted from the city expansion plan. With the continuous development of new college campus and factories, Binjiang District has been attracting a great amount of younger population. In order to resolve the increasing demand on living, the government of Hangzhou opened up the market of untouched land within the district, alluring numerous land agents to publicly bid on. By the end of 2009, there is almost no publicly owned land by the south shore region of Binjiang District.

Surrounded by newly constructed residential complexes, the south bank of Qiantang River brought me the impression of possibility. With majority of the population being educated, Binjiang is the dreamland for young people seeking better opportunities and living environment. Most residents in Binjiang District are new immigrants from a less advanced rural area. It is the only part of Hangzhou, where young people could still afford to purchase condos and settle down new families. It is an inevitable trend to development educational faculties for younger children at Binjiang District, and that is mainly why I chose the Binjiang as my thesis site.

The future of this district is full of probabilities. The redesign of an archetype kindergarten in China involves the integrated

efforts contributed by entire community. Binjiang, the newly planned land of hope, might bring the desired the innovations that would fundamentally changes people's view on early childhood education.

Views:

The thesis site was currently enclosed with concrete walls. It is an incomplete land development among the fully developed residential complexes. The site was presently covered with grasses and random unknowing vegetation. On the north corner of the site, existed an abandoned facility for construction workers. It appears to be an unfinished development of some sort. There is no ongoing project on site from my observation. The Guojiaxinyuan, located at the northern part of the site, is a low-rise residential community that featuring a stripe mall on its south end. Because of that, the north view from the site should be a lively commercial district. The east side of the site is a high-rise multi-purpose plaza. Due to the distance, is appears to be far away from and would not block the east view of the site. The south and west side of the site are nearby residential buildings, yet separated by major road system, the south and west view on site remains clear.

Standing at the north side of the site, one could see the skyline of the newly planned high-rise buildings. With the continuous expansion at Binjiang District, there would be more development near site area.

Light:

As the site is relative distant from buildings located at all four directions, the light condition appears to be very optimistic. Without the distress of unexpected shadow, it is an ideally spot for a low-rise kindergarten design. The abundant natural light on site would also help the outdoor playground for proposed kindergarten.

Wind:

Without the barrier of nearby buildings, the site would potentially become a wind tunnel during the winder seasons. This issued should be taking into consideration while design for the kindergarten.

Human Characteristics:

Crossed from an animated commercial area, there are always people near site. The north side of the site is a major city bus stop. It conveys the flow of people, and may attract potential students from distance.

Distress:

The west side of the site is currently under a newer construction as the additional part for the residential complex. It is the major distress on site.

Quantitative Aspects:

Soil:

The site sits on the soil that is mainly consisted of silt and fine sand. The endurance of the soil is about 100-120KPA. This could be used as foundation for industrial and residential constructions. The land shows an inactive history for natural geological disasters.

Utility:
As the rest of the city, the National Electricity Company in China provides the basic electricity service on site. The site was part of the region uses natural gas as the major supply for cooking.

Vehicular Traffic:

The majority of the vehicular traffic is by the north side of the site. Binsheng road is considered one of the busiest streets within the Binjiang District. Huoju road located on the west side of the site is also a relative busy road.

Pedestrian Traffic:

The site has an active traffic flow for pedestrian due to the location. As the site sits on a dense-residential area, pedestrian could be found on north, west and south side of the site. The east side of the site belongs to a private owned property. Pedestrian traffic appears to be slow on east side alone.

figure 19
Site Phote

figure 20
Base Map
[http://www.soso.com/]

Vehicular and Pedestrian Traffic

vehicular traffic

pedestrian traffic

site

figure 21

Vehicular &Pedestrian Traffic

Site Reconnaissance

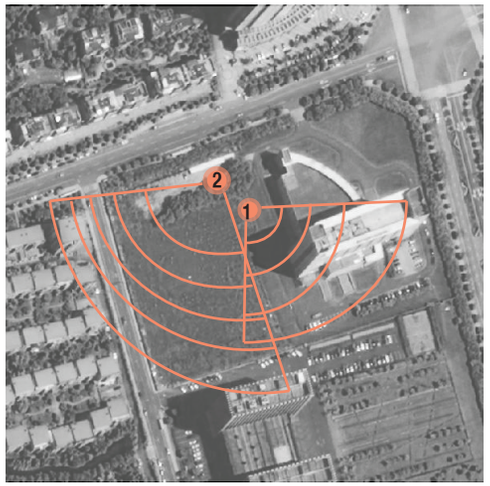


figure 22.1
South -West Panorama View

figure 22.2
South -East Panorama View

Topographic Survey

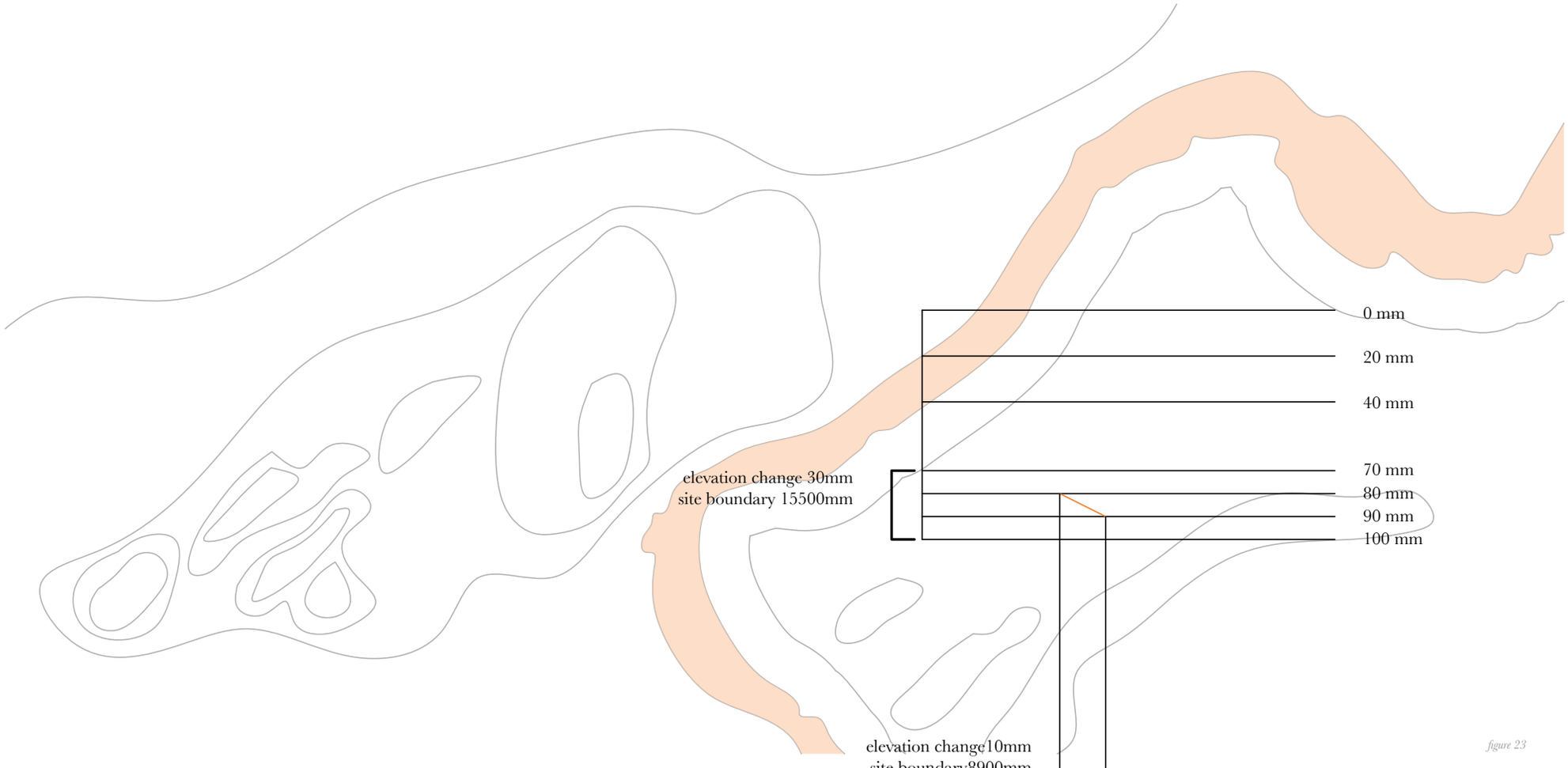


figure 23

Topography and Slope

The site appears to be very flat. Elevation changes are very small on each dimension.

Climate Date

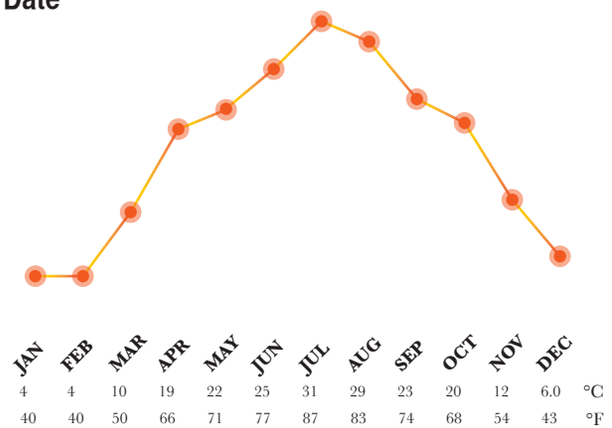


figure 24.1

Average Temperature

Warm season is typically from June to September; cold season starts from December to February.

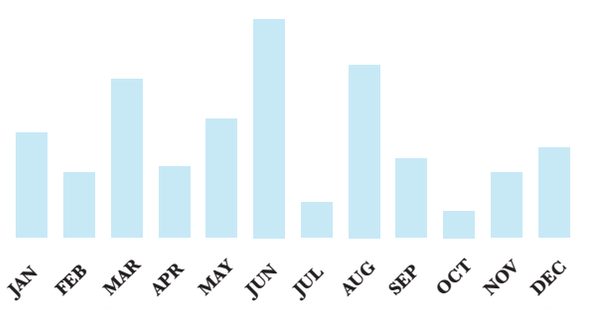


figure 24.2

Monthly Rainfall

Most of the annual precipitation occurs during the spring-summer season.

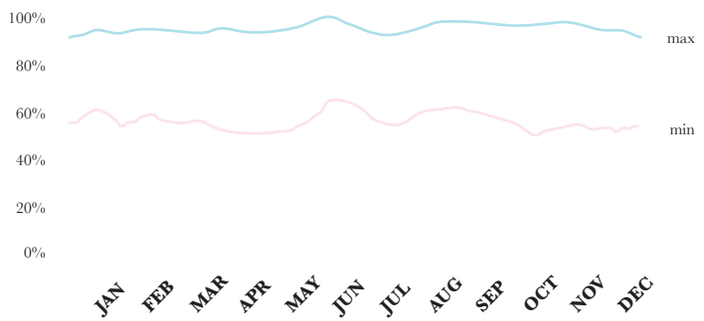


figure 24.3

Humidity

In generally, city of Hangzhou has a very humid environment. The humidity level exceeds 90% year long.

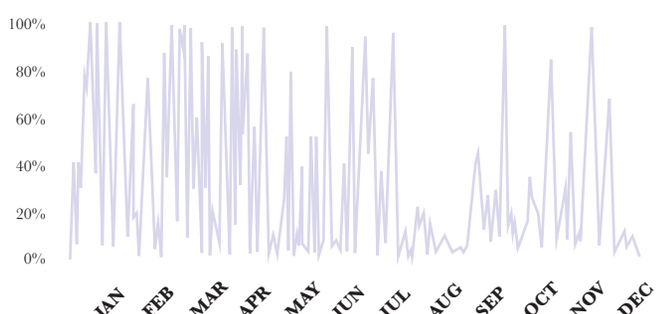


figure 24.4

Cloud Coverage

Most clear days are during the summer season; most cloudy days are during the first half of the year

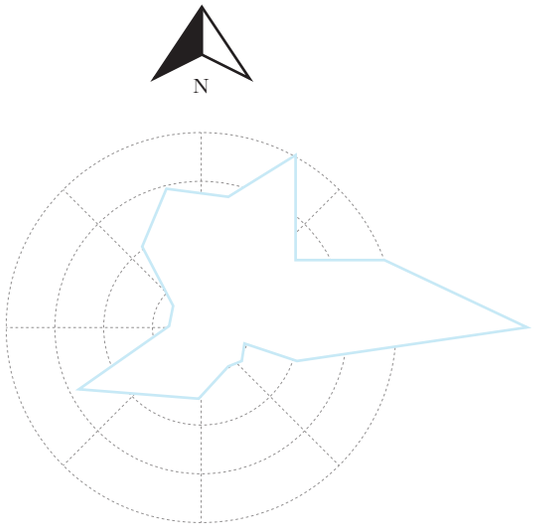


figure 25.1

Wind Direction

Most wind on site comes from the north, where the sea is.

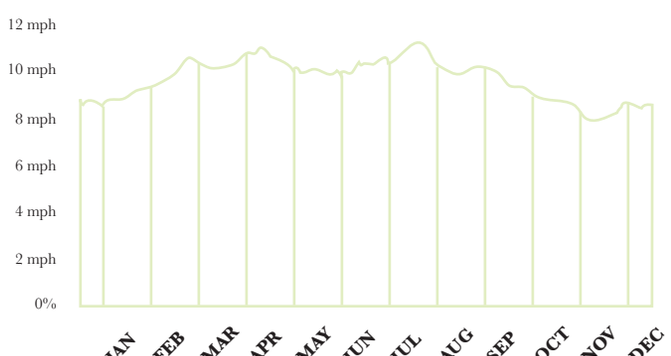


figure 25.2

Wind Speed

Most of the time, the wind on site feels like light breeze. During the summer season, the wind speed reaches the maximum of a year.

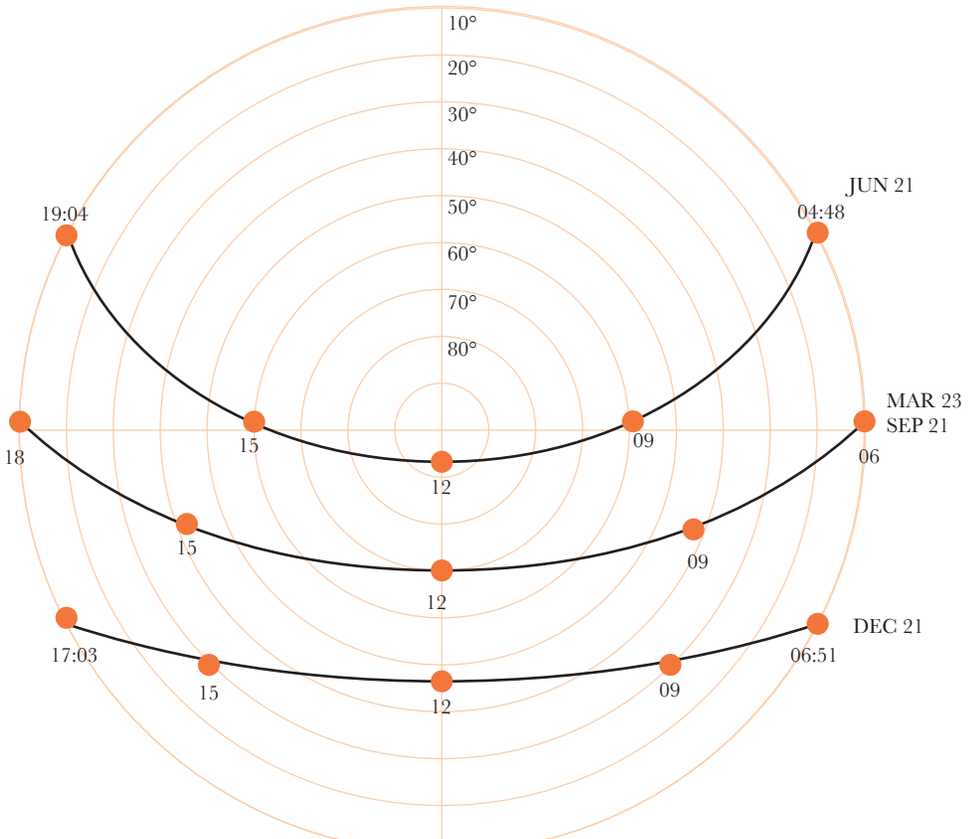


figure 25.3

Sun Path

On the summer solstice, the site reaches the longest daytime; on the winter solstice daytime is the shortest.

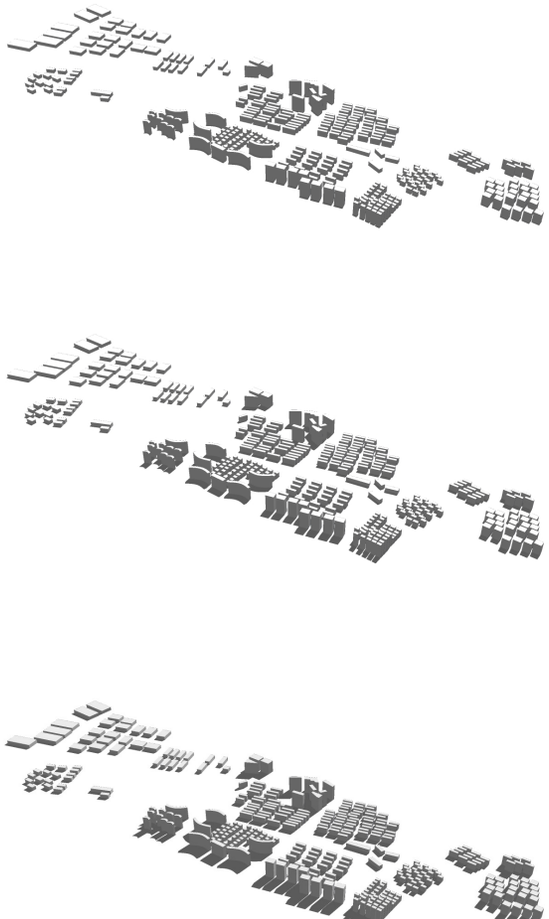


figure 26.1

Solar Study

Diagrams showing the shadow conditions on site .
From top to bottom,
Summer solstice, equinox, winter solstice.

figure 26.2

Noise and Wind

On site most noise comes from the traffic
near by; majority wind comes from the
north east direction

PROGRAMMATIC REQUIREMENTS

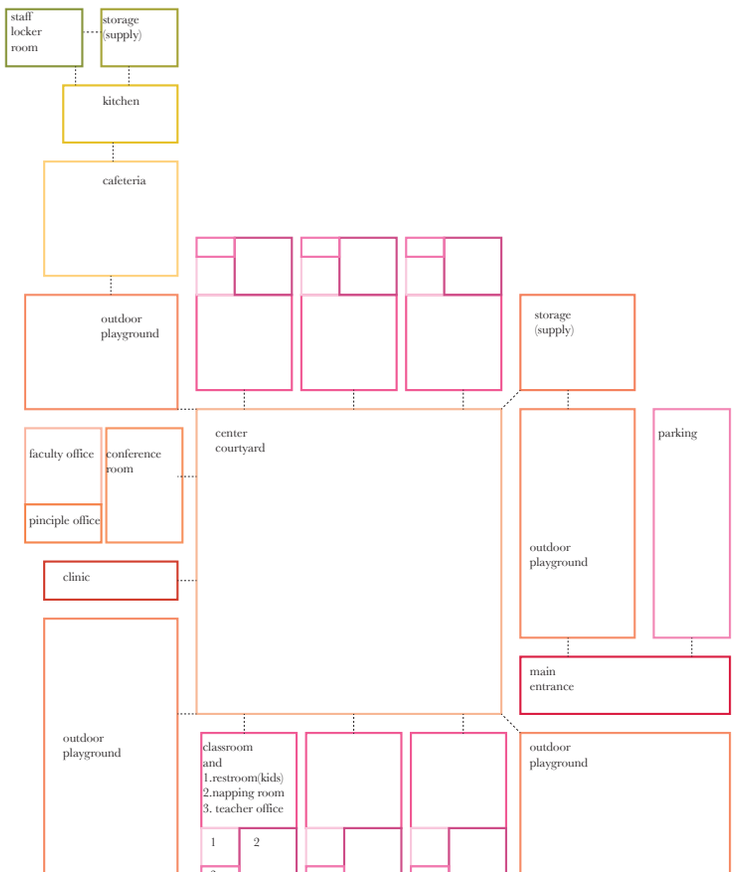


figure 27.1
Space Relation Net

List of Space	Area
Student	**800** m^2
Classroom	400 m^2
Napping room	250 m^2
Restroom	100 m^2
Clinic	50 m^2
Faculty	**640** m^2
Teacher office	120 m^2
Faculty office	120 m^2
Principle office	100 m^2
Conference room	100 m^2
Storage (teaching)	200 m^2
Staff	**550** m^2
Kitchen	250 m^2
Storage (supply)	150 m^2
Staff locker room	150 m^2
Shared	**2370** m^2
Cafeteria	500 m^2
Restrooms	40 m^2
Parking	200 m^2
Center courtyard	600 m^2
Outdoor courtyard	1000 m^2
Entrance	30 m^2

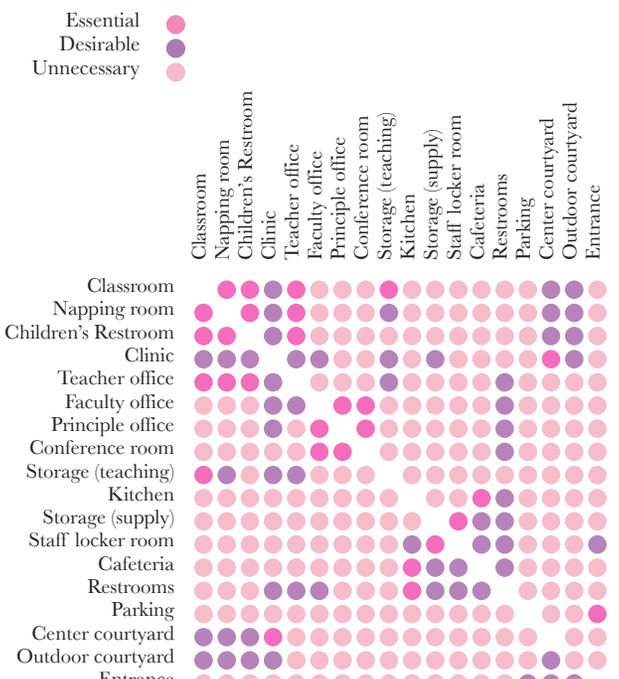
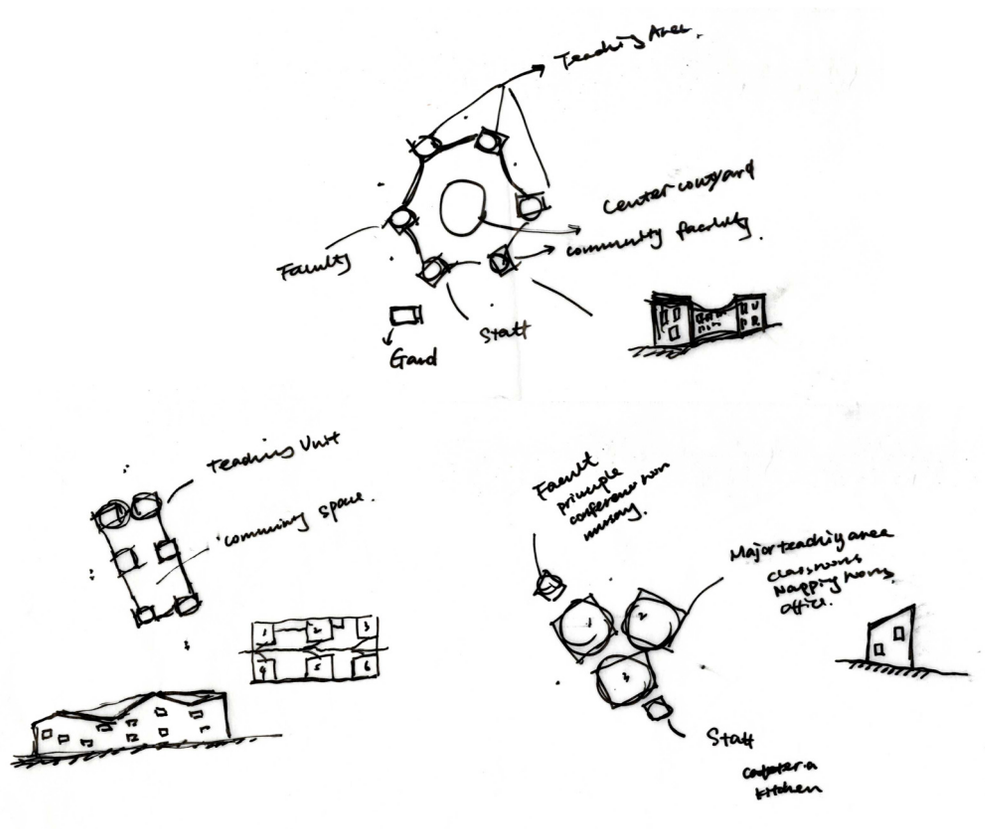


figure 27.2
Space Relation Matrix

figure 28
Kindergarten Entry Render



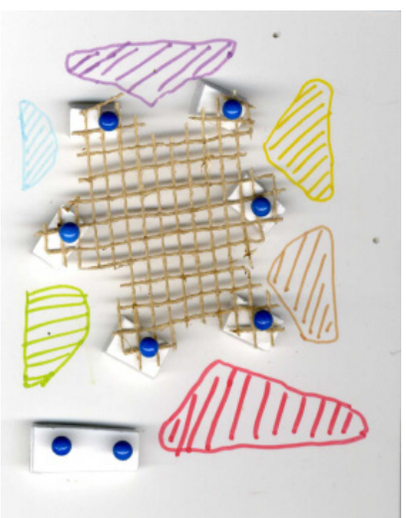
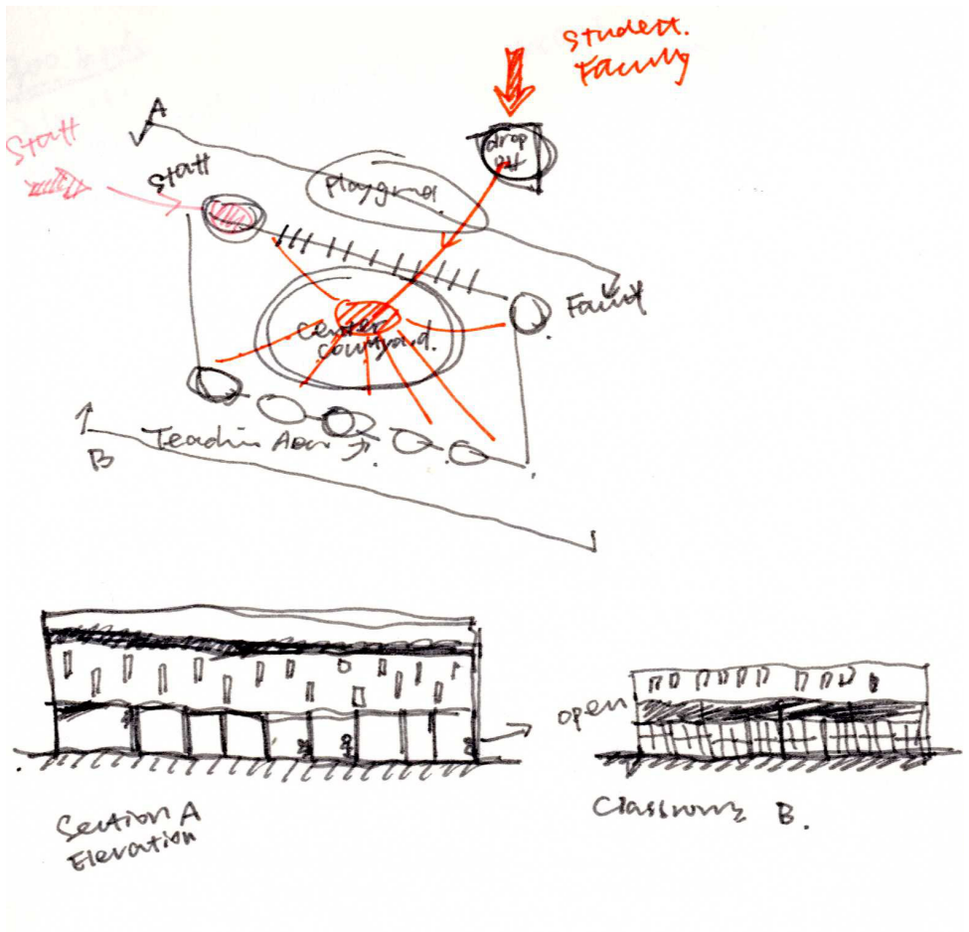


Table 29
Design Process



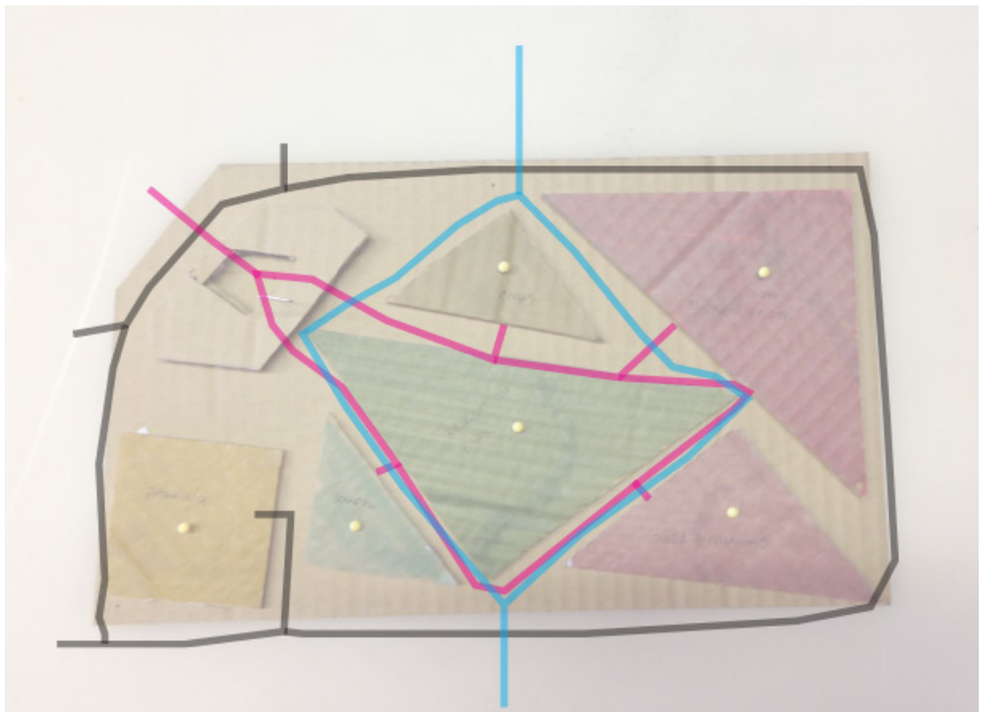
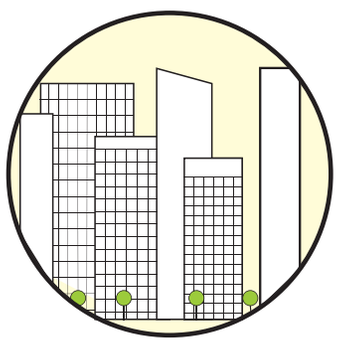
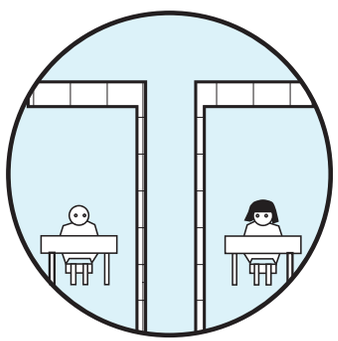


Table 30
Design Process

Issues/ Objective

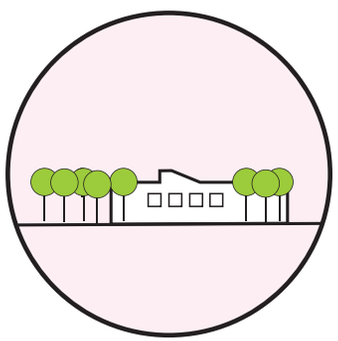


Children are now living in the modern concrete jungle, with the surrounding high-rise buildings that are beyond human scale, kids might feel scared and intimidated.

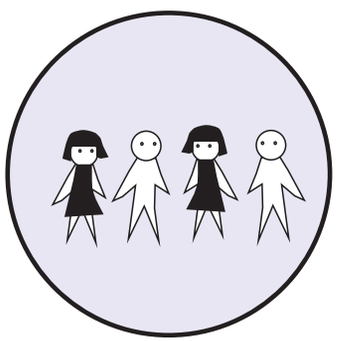


With China's "One Child Policy", children grow up in an environment of solitude. Most kids spend their time without a companionship.

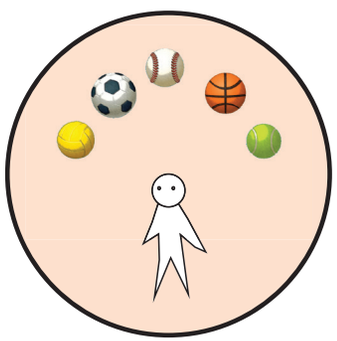
Recent research has shown that the obesity rate for children in China is growing. With more choices of unhealthy food and less active lifestyle, children are at getting bigger in China.



Design a low-rise kindergarten that suits the children scale. Instead of elongating the vertical length, design the site into a widely spread macro city for kids.



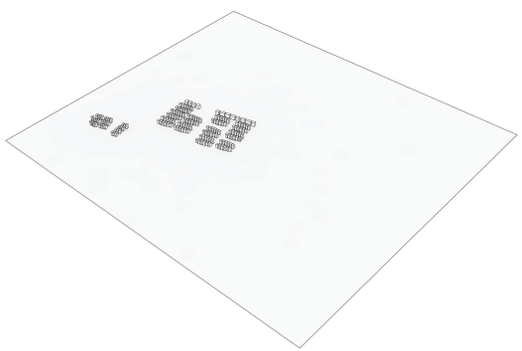
Create more shared spaces that bring children together. Through playful activities, children will develop the sense of community at their preliminary ages.



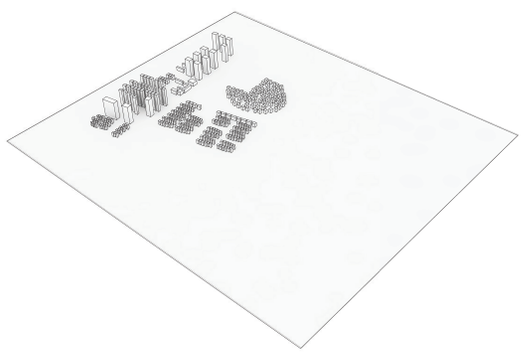
Utilize the site to build an environment that encourages children to participate in more physical activities. Promote the importance of active movements through early childhood development.

figure 31
Issue/ Objective

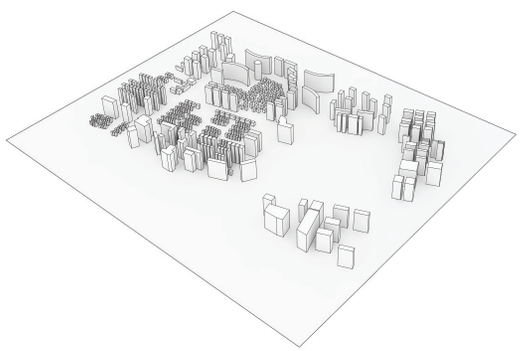
Site Development



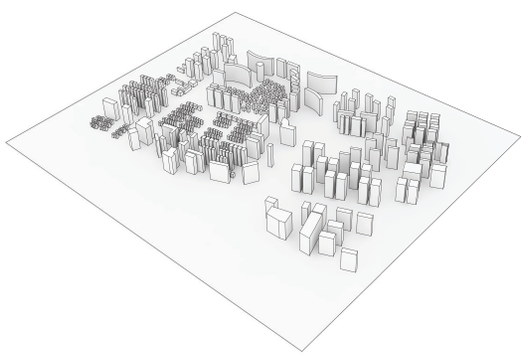
year 1990



year 2000



year 2010



year 2020

figure 32
Site Development

Site Mass

figure 33
Site Mass Render

Site Plan

figure 34.1
Site Plan

Site Diagram

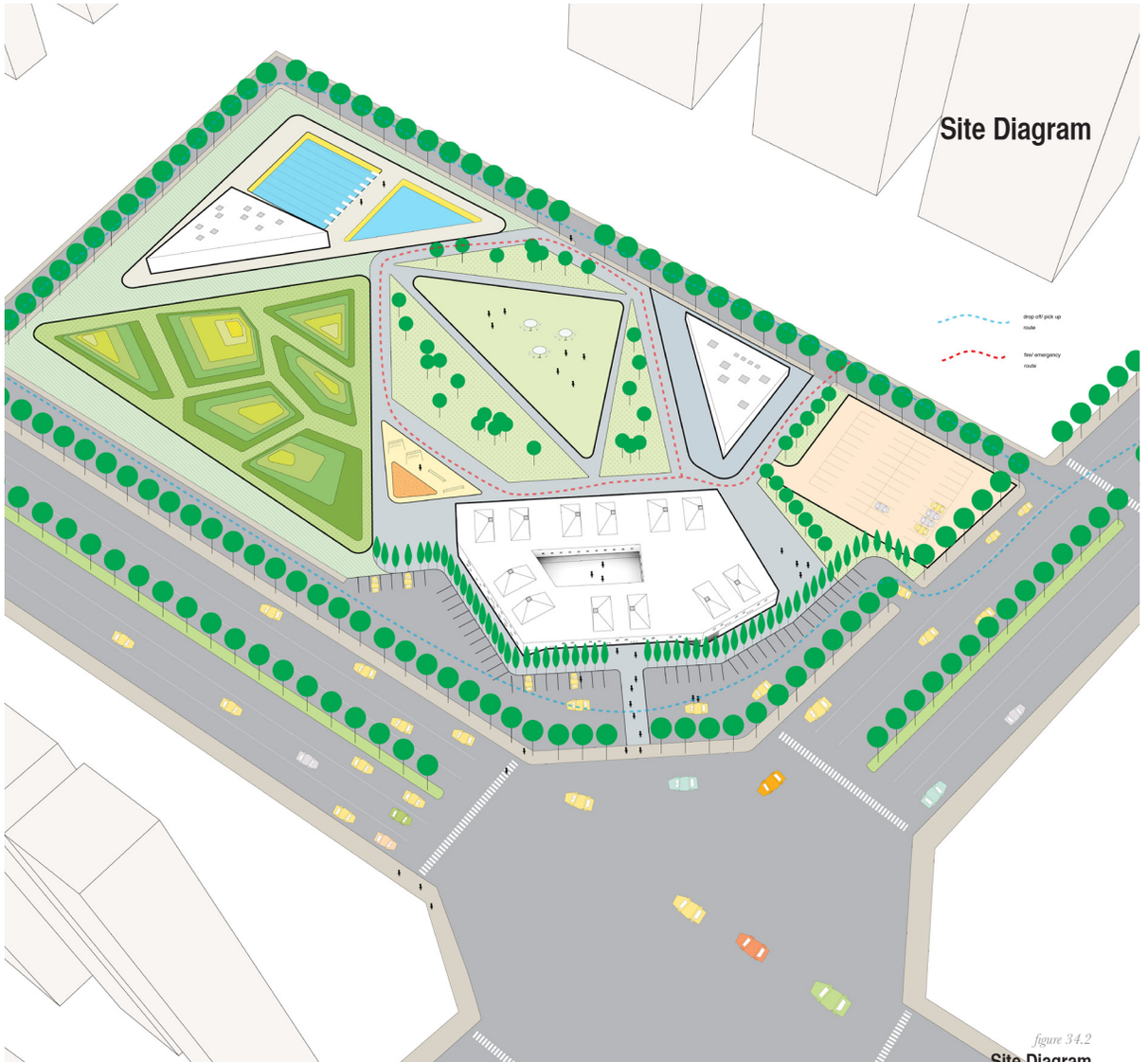
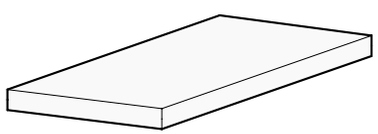
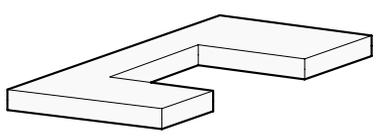


figure 34.2
Site Diagram

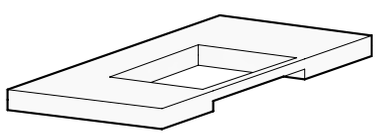
Generation Process



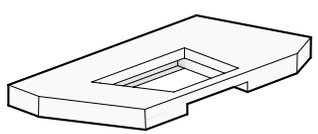
1. Start with a simple parallelogram shape.



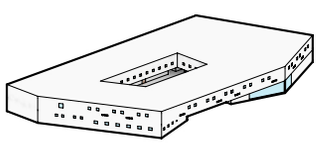
2. Remove the center part to form a basic courtyard.



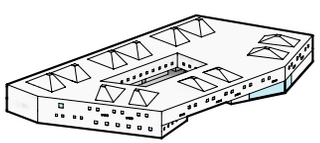
3. Connect second floor with a corridor.



4. Plug in the program needs and cut down the inutile space. Finalize the shape of kindergarten.



4. Refine the edges and design openings for the building facade.

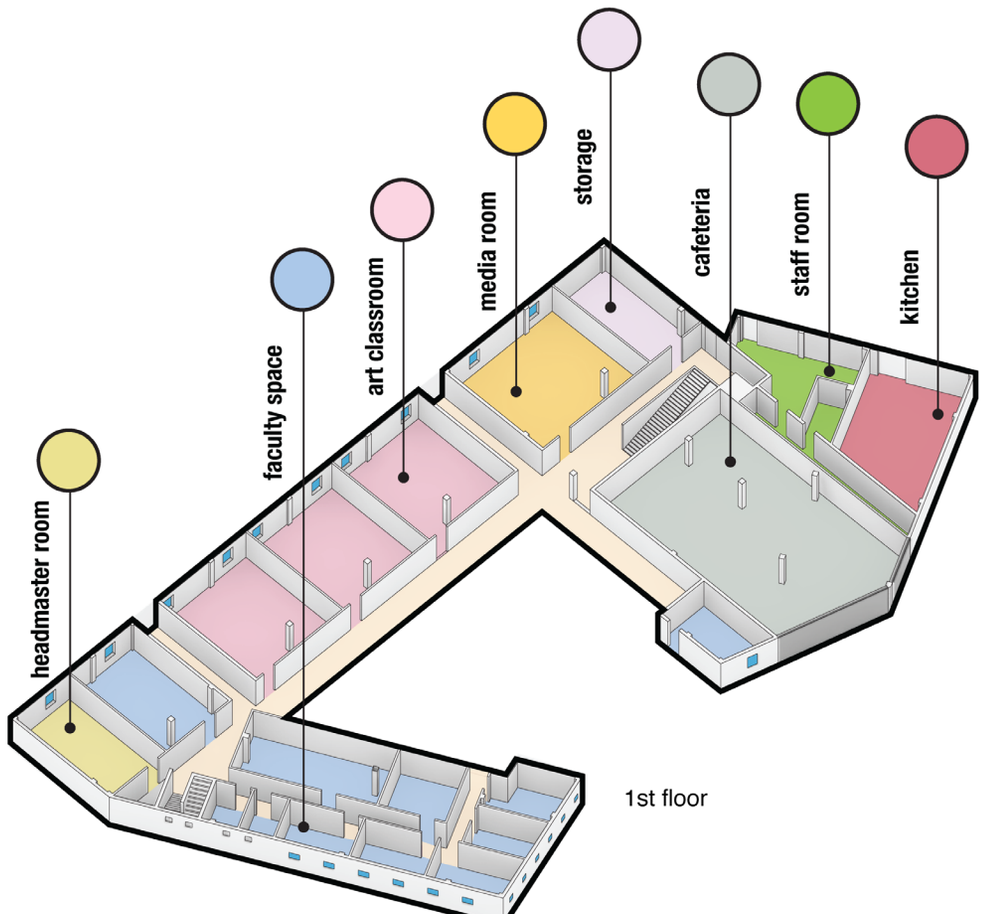


6. Enhance classroom light condition with roof openings.

figure 35

Generation Process

Program Diagram



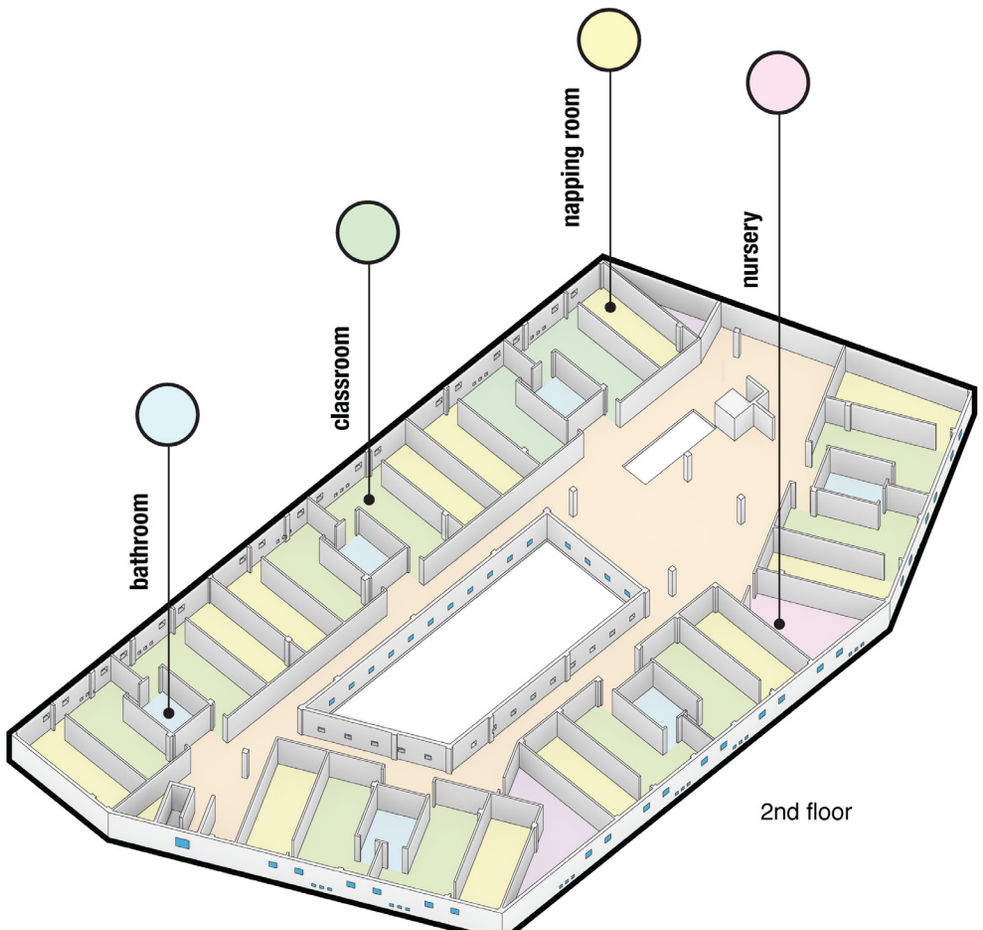


figure 36
Program Diagram

Floor Plan

1st Floor
floor plan

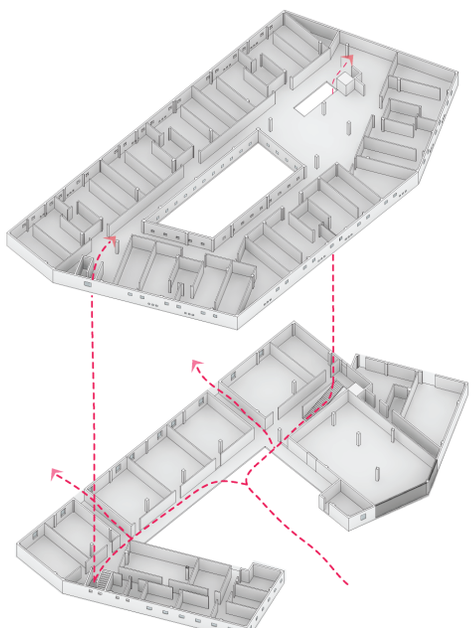
1. reception office
2. adminstration office
3. faculty office
4. faculty restroom
5. office storage room
6. faculty break room
7. headmaster office
8. meeting room
9. art classroom
10. media classroom
11. storage
12. staff locker room
13. staff shower/restroom
14. kitchen
15. cafeteria

2nd Floor
floor plan

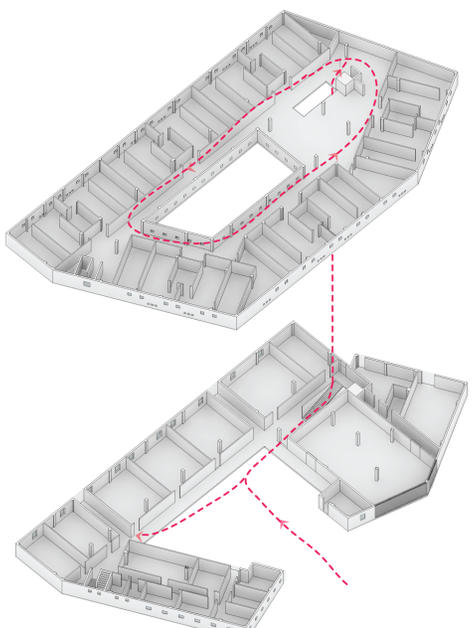
1. classroom
2. restroom
3. napping room
4. nursery
5. storage
6. indoor playground

figure 37
Floor Plan

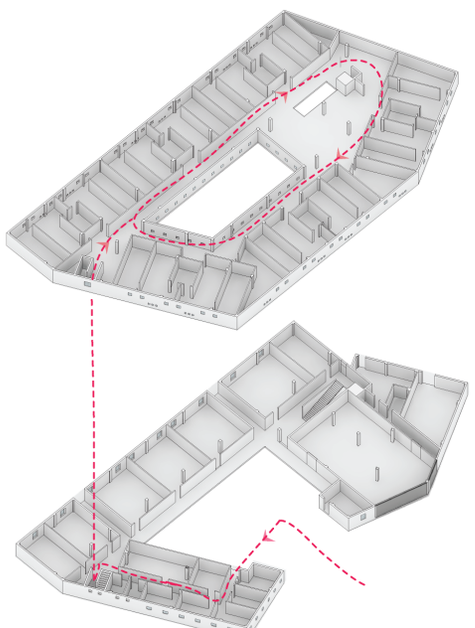
Circulation Analysis



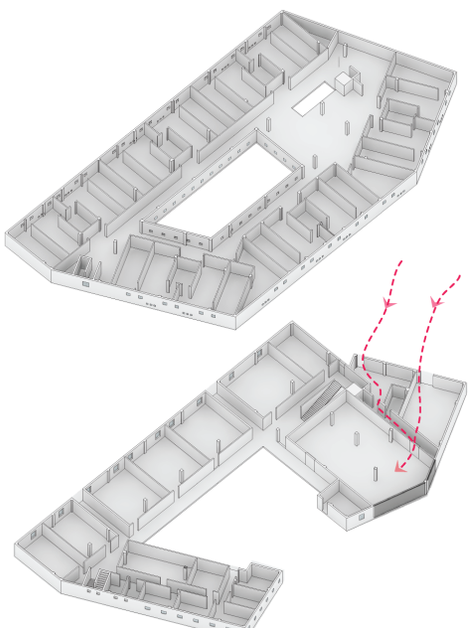
Building Circulation



Kids Route



Faculty Route



Staff Route

figure 38
Circulation Analysis

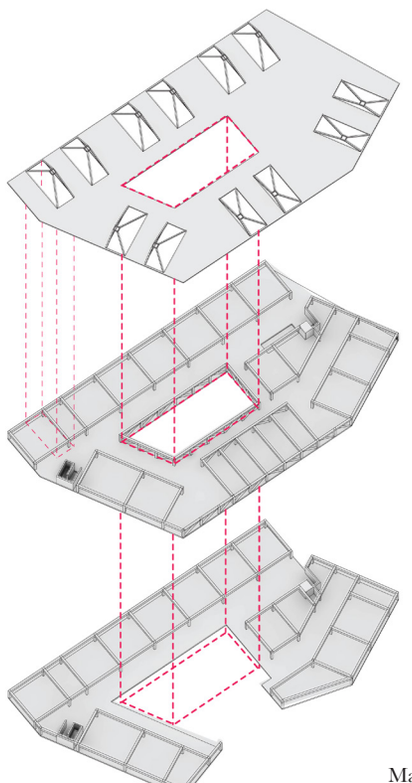
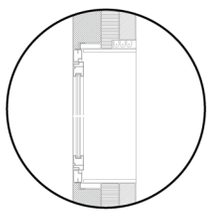


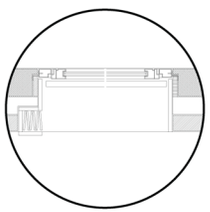
Figure 39.1

Structural System

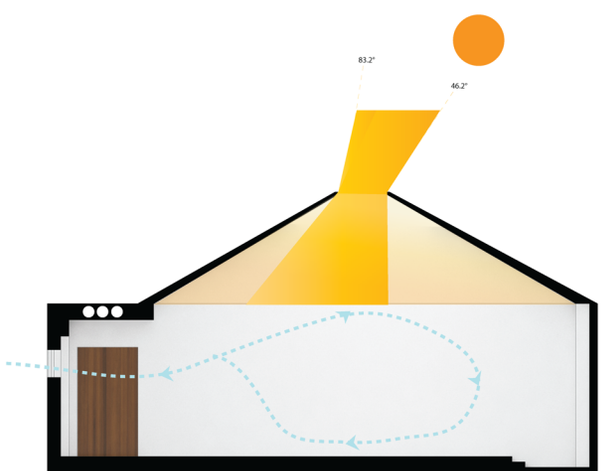
Majority of the building applied column and beam structure.Overhanging areas are secured by truss structure.



Section through window



Horizontal section



Wall Construction

concrete exterior wall	250 mm
thermal insulation	75mm
boarding	30 mm
transparent silicone joint	18mm

Skylight

Roof opening allows the diffusion effect of light. During the day, skylight ensure that there is sufficient daylight for teaching purposes.

Air Flow

Wall openings, as well as HVAC systems ensures the circulation of fresh air in classrooms.

Table 39.2

Performance Analysis

Kindergarten Section

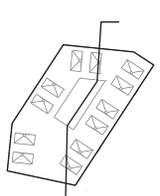


Figure 40.1
Section 1-1

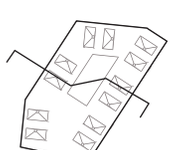


Figure 40.2
Section 2-2

Kindergarten Elevation

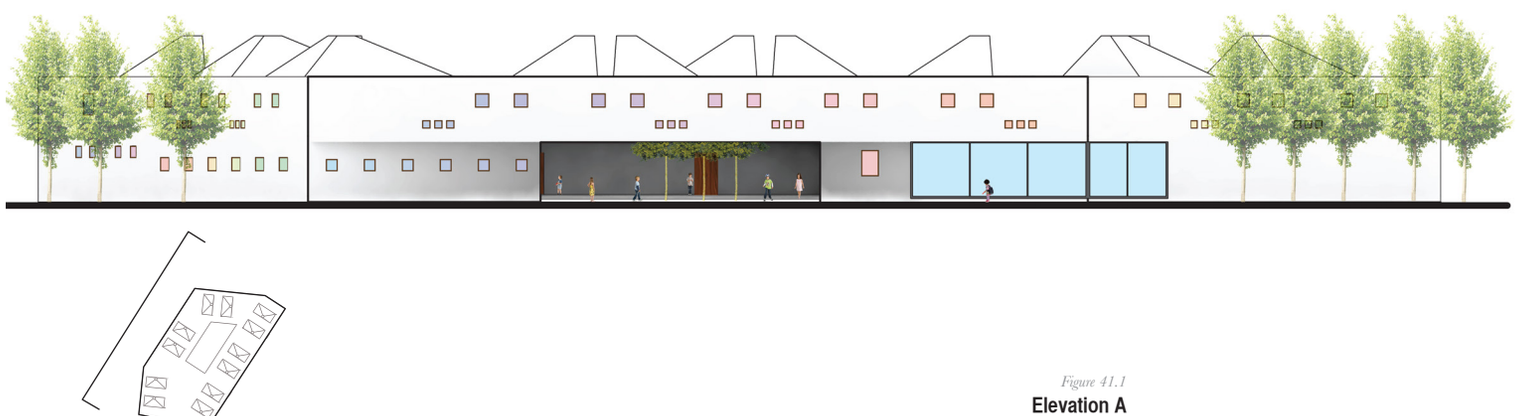


Figure 41.1
Elevation A

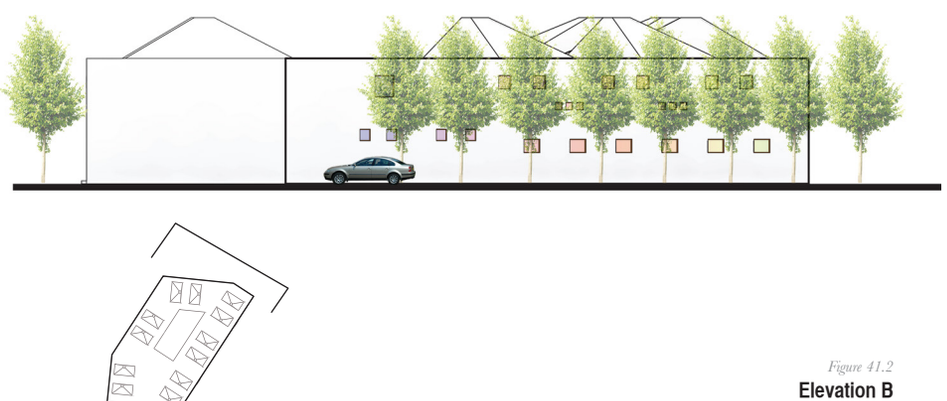


Figure 41.2
Elevation B

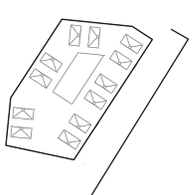


Figure 42.1
Elevation C

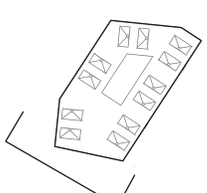


Figure 42.2
Elevation D

Kindergarten Renders

Figure 43
Classroom Render

Figure 44
Arial Render

Figure 45
StaircaseW Render

Figure 46
Hallway Render

Figure 47
Courtyard Render

Final Display

Figure 48.1
Final Board

Figure 48.2
Display

Models

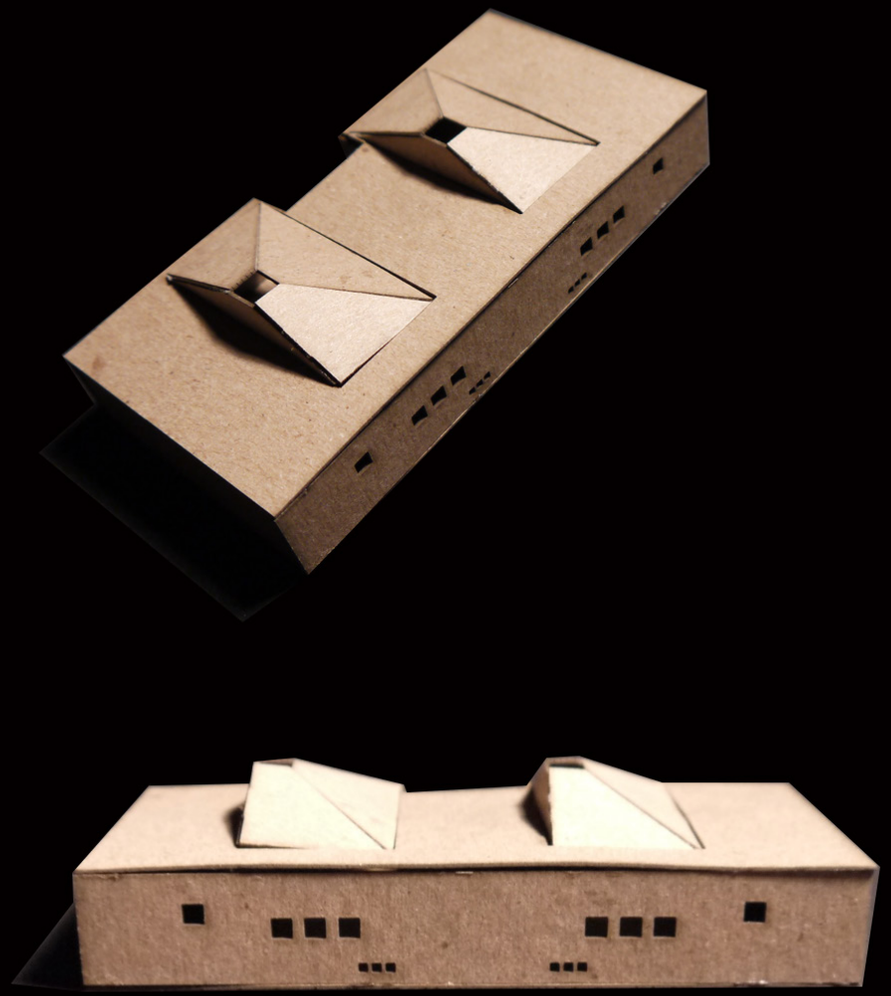


Figure 49.1
Classroom Model

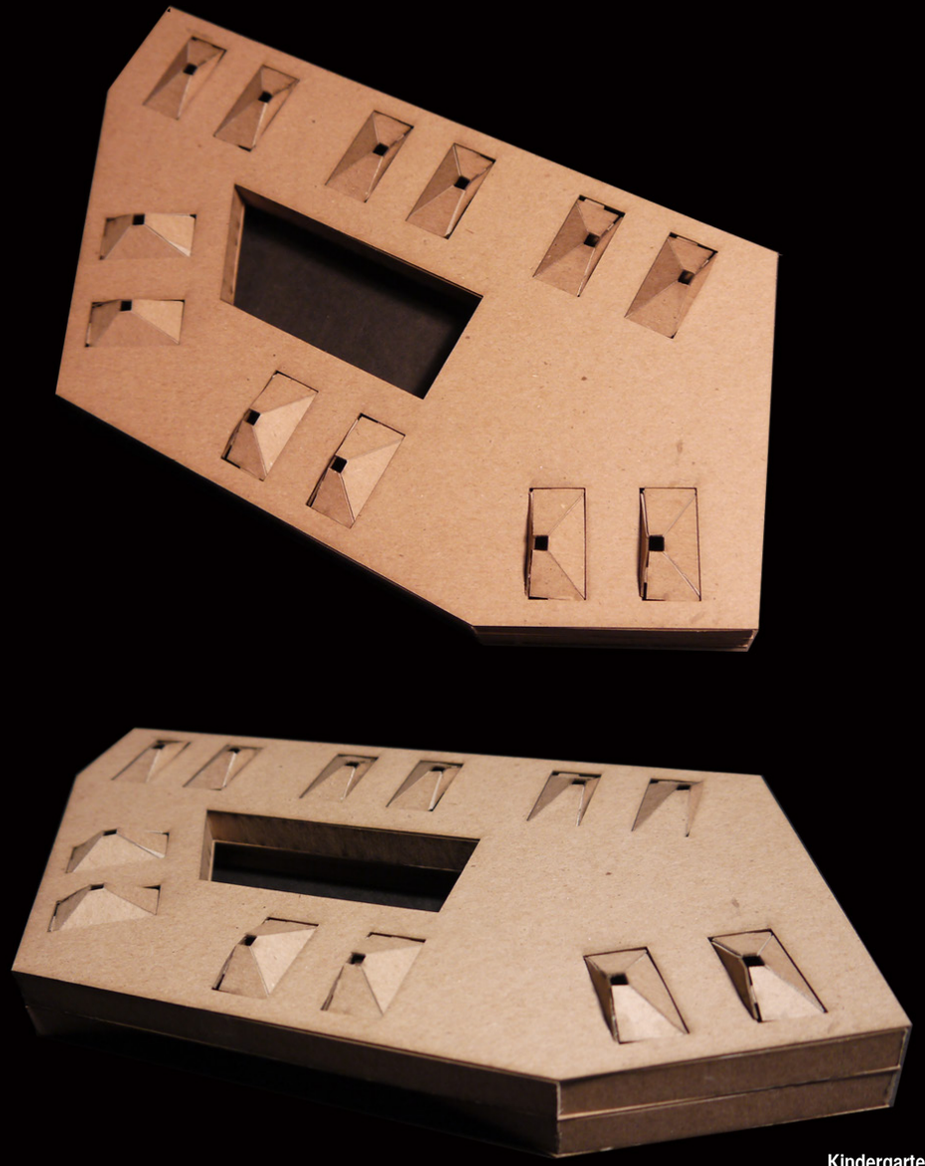
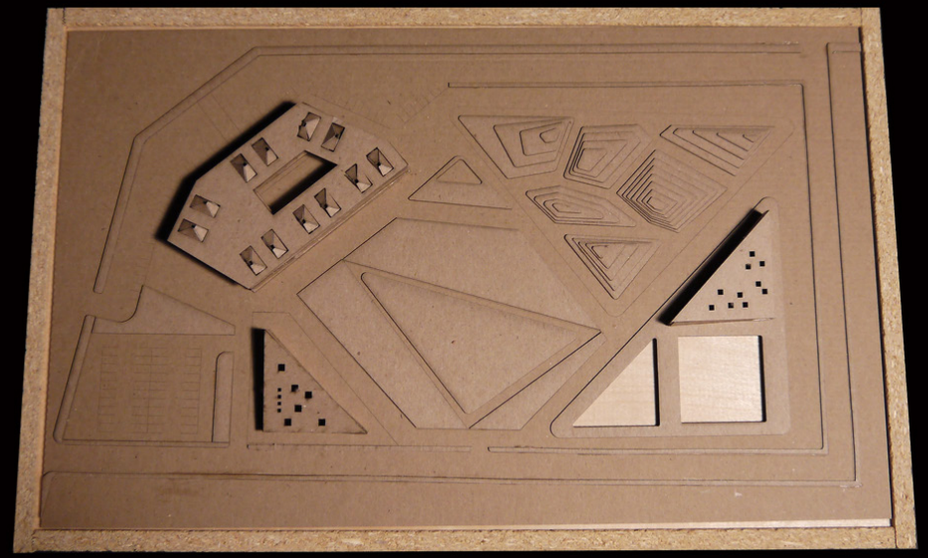
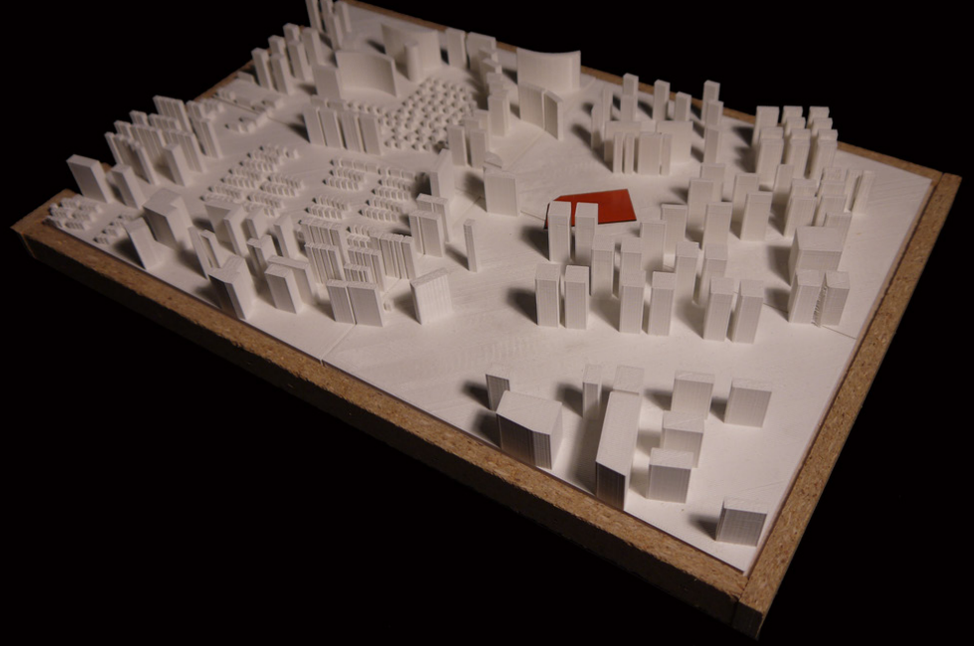


Figure 49.2
Kindergarten Model





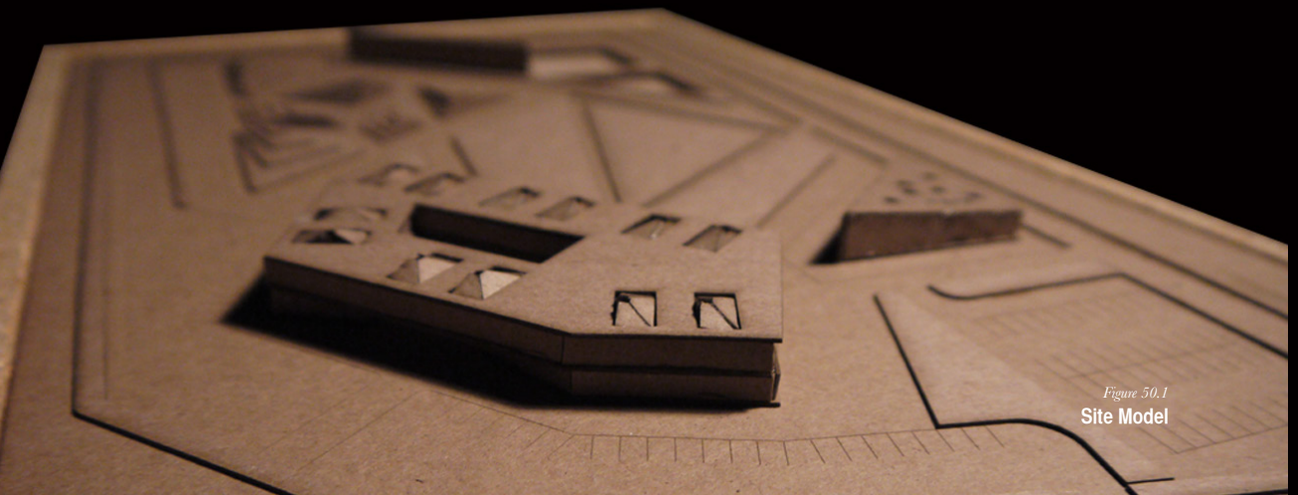


Figure 50.1
Site Model

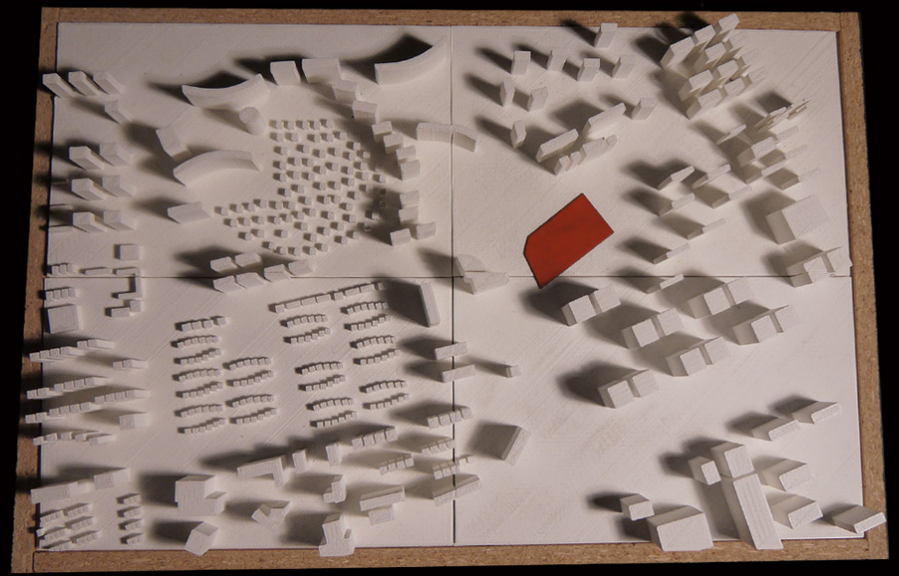


Figure 50.2
Site Mass

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PERSONAL IDENTIFICATION

figure 00
Wenyi Zhang

Wenyi Zhang

Contact Information:
346 Qiangjiang Road
Qianjiangshidai Apartment 6-2202,
Shangcheng District, Hangzhou,
Zhejiang,China, 310012
wenyi.zhang@my.ndsu.edu
+1 701 630 9319 (US)
+86 137 3813 1801 (CHN)

Hometown:
Hangzhou, Zhejiang, China

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